2025
PROSPECTUS

PART 4

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

ISSN 0258-7343

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PARTS OF THE PROSPECTUS

Please Note:

1. Although the information in this Prospectus has been compiled as accurately as possible, the Council accepts no responsibility for any inaccuracies in this publication. This Prospectus is valid for 2025 only.

2. Life Orientation and an achievement Level of 1 in a subject are not considered in the calculation of the Admission Point Score (APS).

3. Prospective students will not be admitted to any qualification without prior evaluation.

4. The indicated non-refundable administration fee and certified copies of the applicant's identity document, Senior Certificate/National Senior Certificate and all other relevant documents must accompany the completed application form or online application.

5. The closing dates for admissions are available on the University's website.

6. A student must complete a qualification at the learning site where he/she was accepted and is registered. A transfer between sites will only be allowed if the student follows the following process:

    - A formal request must be submitted to the academic manager/Head of the Department on the current learning site before the second Friday in May (to be considered for transfer in July of the same year) or the second Friday in October (to be considered for a transfer in January of the following year). The request must contain the reasons for the transfer.

    - A committee will meet shortly after each of the closing dates for submissions to consider every request on merit, keeping in mind the availability of space and the adherence to enrolment quotas on respective learning sites. Students will be informed of the outcome.

Important:
TUT admission requirements for entry-level programmes adhere to national legislation and therefore the following are required:

- Bachelor's degrees: at least four subjects at performance level 4.

- Diplomas: at least four subjects at performance level 3.

Please verify specific and additional requirements per programme as indicated in the Prospectus.

ACCEPTANCE IS SUBJECT TO AVAILABLE CAPACITY ACCORDING TO THE STUDENT ENROLMENT PLAN (SEP)
Alternative and international qualifications (HIGSCE, IGCSE, NSSC A&O Level, IB Higher and Standard Level, etc.) are dealt with in a specific manner:

- While there is a legal imperative to submit the certificate of equivalence (issued by SAQA or the CHE), it is recommended that the application process be initiated while the application for the certificate is in process.

- The Tshwane University of Technology cannot obtain this certificate on the applicant's behalf.

CONVERSION OF ALTERNATIVE/EQUIVALENT RECOGNISED CERTIFICATES

The following table and accompanying information give an indication of how the University will evaluate the various certificates that may be offered as equivalent to the National Senior Certificate (SA). Where possible, the University will evaluate the listed qualifications as indicated. However, the University has the right to refer any application to the formal application processes through the Senate.

APS	NSC	NC-V	HIGCSE	IGCSE/GCSE/ NSSC O-LEVEL		A-LEVEL	IB-HL	IB-SL	SAT
				Gr 11	Gr 12				
10						A	7		
9									
8						B	6		
7	7 (80 -100)	Outstanding competent (80-100%)	1	A		C	5	7	80-100
6	6 (70 -79)	4-Highly competent (70-79%)	2	B		D	4	6	70-79
5	5 (60-69)	3-Competent (60-69%)	3	C	A	E	3	5	60-69
4	4 (50-59)	3-Competent (50-59%)		D	B		2	4	50-59
3	3 (40-49)	Not yet Competent (40-49%)	4	E	C		1	3	40-49
2	2 (30-39)	Not achieved (0-39%)		F	D/E			2	30-39
1	1 (0-29)			G	F/G			1	0-29

NSC	National Senior Certificate
NC-V	National Certificate (Vocational)
IGCSE	International General Certificate of Secondary Education
HIGCSE	Higher International General Certificate of Secondary Education
SAT	Senior Academic Test/Senior Academic Proficiency Test
NSSC	Namibia Senior Secondary Certificate
O-LEVEL	Ordinary level
A-LEVEL	Advanced level
IB	International Baccalaureate Schools (higher and standard levels)

Please Note:

As from March 2005, a minimum score of 1500 is needed for admission to a National Diploma, with a subminimum of not less than 460 for Critical Reading, Mathematics and Writing. In accordance with HESA requirements, a minimum score of 1600 is needed for admission to a degree, with a subminimum of not less than 500 for Critical Reading and Mathematics and 550 for Writing. The percentiles on the SAT certificate can be used to derive scores for Mathematics and English, as indicated in the table above. The student's college entrance certificate (such as the certificate issued by the ACE School of Tomorrow) or individual SAT subject tests should be used for the scores of any other subjects required.

RECOGNITION OF PRIOR LEARNING, EQUIVALENCE AND STATUS

Candidates may also apply at the Office of the Registrar for Recognition of Prior Learning (RPL) or for admission via the Senate's discretionary route. The specific relevant documentation will be requested from these applicants, and these cases will be handled on an individual basis. Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

CONTENTS

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

At the time of publication, the information was as follows:

Executive Dean:	Dr MG Kanakana-Katumba - MBA (NMMU), DPhil (Engineering Management) (UJ)
Executive Secretary:	TBT Khumalo
Telephone number:	012 382-5328
E-mail address:	Khumalotbt@tut.ac.za
Office:	Building 3, Room 622B, Pretoria Campus
Assistant Dean: (Research and Innovation)	Dr MB Shongwe - PhD (Engineering) (Metallurgy) (Wits)
Assistant Dean: (Special Projects and WIL)	Dr SJ Jacobs - D Tech (Engineering) (Electrical) (TUT)
Assistant Dean: (Teaching, Learning and Technology)	Prof MC Khoathane - D Tech (Polymer Technology) (TUT)
Assistant Registrar:	Dr MJ Pieterse
Office:	Dinokeng Building, Room G125, Pretoria Campus

VISION

To be a Faculty that drives innovation and engagement for a sustainable society.

MISSION

To advance technology and economic transformation through relevant curricula, impactful research, collaborations, and community engagements.

VALUES

- Excellence
- Resource efficiency
- Creativity
- Agility
- Care
- Accountability

STRATEGIC GOALS

1. To deploy student-centred educational practices;
2. To foster capacity development within the faculty;
3. To develop innovation value chain amongst staff and students;
4. To align Faculty research with sustainable development goals to improve research impact; and
5. To integrate technology in all that we do.

SECTION A: DEPARTMENTS AND QUALIFICATIONS

SECTION A1: THE BUILT ENVIRONMENT PROGRAMMES

1. QUALIFICATIONS OFFERED BY THE BUILT ENVIRONMENT

Please turn back to the contents (page 5) for an indication of programmes offered.

2. CRITICAL CROSS-FIELD OUTCOMES

The programmes have the following critical cross-field outcomes:

- Identify and solve problems that display responsible decisions, using critical and creative thinking.
- Work effectively with others as a member of a team, group, organisation and community.
- Organise and manage one's activities responsibly and effectively.
- Collect, analyse, organise and critically evaluate information.
- Communicate effectively, using visual, mathematical and/or language skills in the modes of oral and/or written persuasion.
- Use science and technology effectively and critically, showing responsibility towards the environment and health of others.
- Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.
- Contribute to the full personal development of each student and the social and economic development of society at large, by making it an underlying intention of the programme of learning to make an individual aware of:
  - Reflecting on and exploring a variety of strategies to learn more effectively.
  - Participating as responsible citizens in the life of local, national and global communities.
  - Being culturally and aesthetically sensitive across a range of contexts.
  - Exploring education and career opportunities.
  - Developing entrepreneurial opportunities.

1. DEPARTMENT OF ARCHITECTURE AND INDUSTRIAL DESIGN

1.1 BACHELOR OF ARCHITECTURE

BArch - NQF Level 8 (480 credits)
(Fields of specialisation: Design or Technology)
Qualification type: Professional Bachelor's Degree
Qualification code: BPAR20
SAQA ID: 110794, CHE NUMBER: H/H16/10740/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate with a matriculation endorsement (**or** an equivalent qualification), with a D symbol (50 – 59%) at Higher Grade or a C symbol (60 – 69%) at Standard Grade for English.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **25** (six subjects).

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate, with a bachelor's degree endorsement (four subjects with a minimum score of 4 in the subjects), or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language).

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **25** (excluding Life Orientation).

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least 50% (APS of 4) for English (first additional language), 50% (APS of 4 for Mathematics or Mathematical Literacy, 50% for Life Orientation (excluded for APS calculation) and at least 60% (APS of 5) for any four other vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **25** (excluding Life Orientation).

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

  The applicant will be considered for admission to the programme if a qualification is in Architecture or Architectural Technology or a related field of study on NQF Level 5 or above with an average of at least 60% for all modules completed.

Selection criteria:
Admission will be based on academic performance; availability of space; and an interview.

b. Assessment procedure(s):
After passing the initial administrative screening, all applicants will sit for an additional assessment arranged with the Department. The purpose of the assessment is to select only those applicants who are most likely to be successful in their studies in Architecture. Preference would be given to first-time entering students. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Information pertaining to the assessment is available on the Department's website: www.tutarchitecture.co.za.

Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes. Classes and assessments may take place on Friday afternoons and/or Saturdays.

f. Minimum duration:
Four years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Class timetables and class times:
Students will only be permitted to register for modules in different year groups if the scheduled contact sessions for those modules do not coincide. Students should therefore take note of scheduled contact sessions and class times before registering.

i. Generic requirements:
The modules taught in each year have been put together in order to provide the student with the necessary platform of skills, knowledge and mindset to enable them to solve the problems that they will encounter during that year of study. It is one package designed to work together to promote horizontal integration. If any part of that package of knowledge, skills and mindset is missing or lacking, the platform to progress to the next level of complexity is flawed and will eventually have a detrimental effect on subsequent development.

Students should attempt to enrol for all modules offered in a particular year for reasons of horizontal integration. Students who do not wish to enrol for all the modules for a specific year, but only for some of them, are subject to the combinations and sequences as explained in the curriculum of each year and the Head of the Department must give permission in these instances.

The Department is of the opinion that any student who does not hand in any two consecutive assignments or does not hand in any three assignments has not shown sufficient attendance as contemplated in rules 14.3 and 14.4(a) of the Students' Rules and Regulations (Part 1). Such a student will not be allowed entry to the final portfolio or oral examinations in these modules/subjects. Such students will be considered to have deregistered these modules/subjects in terms of rule 14.4(c) of the Students' Rules and Regulations (Part 1).

Prerequisite modules will only be waived in highly exceptional cases, based on a motivation by the Head of the Department and approved by the Executive Dean.

j. Degree validation and accreditation:
The South African Council for the Architectural Profession (SACAP) accredits both the fourth-year specialisation options for registration in the SACAP category of Candidate Senior Technologist. The qualification is internationally validated through the Canberra Accord (CA). The CA facilitates the portability of educational credentials amongst participating member countries by recognising the similarity of professional architecture degrees. CA signatories include Canada, China, Korea, Mexico, South Africa, the USA and a further 35 countries represented by the Commonwealth Association of Architects (CAA).

CURRICULUM

FIRST YEAR
Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- ACD105P and THR105P
- ACD105P and CST105P
- BPS105P and CST105P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
- THR105P may not precede ACD105P, because THR105P is integrated with ACD105P. If THR105P has been passed previously, a student may continue with ACD105P.
- CST105P may not precede ACD105P, because CST105P is based on ACD105P. If ACD105P was passed previously, a student may continue with CST105P.
- BPS105P may not precede CST105P, because BPS105P is based on CST105P. If BPS105P was passed previously, a student may continue with CST105P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ACD105P	Architectural Design I	(5)	(48)	
BPS105P	Building Physics and Systems Design I	(5)	(12)	
CAR125P	Computer Applications in Architecture I (block-module)	(5)	(12)	
CST105P	Construction I	(5)	(18)	
PFR125P	Professional Practice I (block module)	(5)	(6)	
PTR105P	Presentation Techniques I	(5)	(12)	
THR105P	Theory and History of Architecture I	(5)	(12)	
TOTAL CREDITS FOR THE FIRST YEAR:			**120**	

SECOND YEAR
Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- ACD216P and THR216P
- ACD216P and CST216P
- BPS216P and CST216P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
- THR216P may not precede ACD216P, because THR216P is integrated with ACD216P. If THR216P has been passed previously, a student may continue with ACD216P.
- CST216P may not precede ACD216P, because CST216P is based on ACD216P. If ACD216P was passed previously, a student may continue with CST216P.
- BPS216P may not precede CST216P, because BPS216P is based on CST216P. If BPS216P was passed previously, a student may continue with CST216P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
FIRST OR SECOND SEMESTER				
ACD216P	Architectural Design II	(6)	(48)	Architectural Design I Construction I Theory and History of Architecture I
BPS216P	Building Physics and Systems Design II	(6)	(6)	Building Physics and Systems Design I
CAR226P	Computer Applications in Architecture II (block-module)	(6)	(6)	Computer Applications in Architecture I
CST216P	Construction II	(6)	(12)	Architectural Design I Construction I Theory and History of Architecture I
PFR216P	Professional Practice II	(6)	(36)	Professional Practice I
THR216P	Theory and History of Architecture II	(6)	(12)	Architectural Design I Construction I Theory and History of Architecture I
TOTAL CREDITS FOR THE SECOND YEAR:			**120**	

THIRD YEAR

Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:

- ACD307P and THR307P
- ACD307P and CST307P
- BPS307P and CST307P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:

- THR307P may not precede ACD307P, because THR307P is integrated with ACD307P. If THR307P has been passed previously, a student may continue with ACD307P.
- CST307P may not precede ACD307P, because CST307P is based on ACD307P. If ACD307P was passed previously, a student may continue with CST307P.
- BPS307P may not precede CST307P, because BPS307P is based on CST307P. If BPS307P was passed previously, a student may continue with CST307P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ACD307P	Architectural Design III	(7)	(54)	Architectural Design II Construction II Theory and History of Architecture II
BPS307P	Building Physics and Systems Design III	(7)	(12)	Building Physics and Systems Design II
CAR327P	Computer Applications in Architecture III (block-module)	(7)	(18)	Computer Applications in Architecture II
CST307P	Construction III	(7)	(18)	Architectural Design II Construction II Theory and History of Architecture II
PFR327P	Professional Practice III (block module)	(7)	(6)	Professional Practice II
THR307P	Theory and History of Architecture III	(7)	(12)	Architectural Design II Construction II Theory and History of Architecture II
TOTAL CREDITS FOR THE THIRD YEAR:			**120**	

FOURTH YEAR
One of the following options (as determined by the Head of the Department):

OPTION 1: ARCHITECTURAL DESIGN:
In order to continue with this option, a student must obtain a minimum mark of 70% in the final examination for Architectural Design III. Should he/she not meet this requirement, he/she will only be allowed to continue with this option if recommended by the examination panel for Architectural Design III and Theory and History of Architecture III and the subsequent endorsement by the Head of the Department.

Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- ACD408P and THR408P
- ACD408P and CST418P
- BPS418P and CST418P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
- THR408P may not precede ACD408P, because THR408P is integrated with ACD408P. If THR408P has been passed previously, a student may continue with ACD408P.
- CST418P may not precede ACD408P, because CST418P is based on ACD408P. If ACD408P was passed previously, a student may continue with CST418P.
- BPS418P may not precede CST418P, because BPS418P is based on CST418P. If BPS418P was passed previously, a student may continue with CST418P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ACD408P	Architectural Design IV	(8)	(54)	Architectural Design III Construction III Theory and History of Architecture III
CAR428P	Computer Applications in Architecture IV (block-module)	(8)	(12)	Computer Applications in Architecture III
THR408P	Theory and History of Architecture IV	(8)	(12)	Architectural Design III Construction III Theory and History of Architecture III
FIRST SEMESTER				
BPS418P	Building Physics and Systems Design IV	(8)	(12)	Building Physics and Systems Design III
CST418P	Construction IV	(8)	(18)	Architectural Design III Construction III Theory and History of Architecture III
PFR418P	Professional Practice IV	(8)	(12)	Professional Practice III
TOTAL CREDITS FOR THE FOURTH YEAR FOR OPTION I:			**120**	

OPTION 2: ARCHITECTURAL TECHNOLOGY:
Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- STW408P, CST418P and ACC418P
- STW408P, BPS418P and ABP418P
- CST418P and ACC418P
- BPS418P and ABP418P
- PFR418P and APC418P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:

- CST418P and ACC418P may not precede STW408P, because CST418P and ACC418P are based on STW408P. If CST418P and/or ACC418P were passed previously, a student may continue with STW408P.
- BPS418P and ABP418P may not precede STW408P, because BPS418P and ABP418P are based on STW408P. If BPS418P and ABP418P were passed previously, a student may continue with STW408P.
- ACC418P may not precede CST418P, because ACC418P is based on CST418P. If ACC418P was passed previously, a student may continue with CST418P.
- APC418P may not precede PFR418P, because APC418P is based on PFR418P. If APC418P was passed previously, a student may continue with PFR418P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
CAR428P	Computer Applications in Architecture IV (block-module)	(8)	(12)	Computer Applications in Architecture III
STW408P	Studio Work IV	(8)	(30)	Architectural Design III Construction III Theory and History of Architecture III
FIRST SEMESTER				
BPS418P	Building Physics and Systems Design IV	(8)	(12)	Building Physics and Systems Design III
CST418P	Construction IV	(8)	(18)	Architectural Design III Construction III Theory and History of Architecture III
PFR418P	Professional Practice IV	(8)	(12)	Professional Practice III
SECOND SEMESTER				
ABP418P	Advanced Building Physics and Systems Design IV	(8)	(12)	Building Physics and Systems Design IV Professional Practice IV
ACC418P	Advanced Construction IV	(8)	(12)	Architectural Design III Construction III Construction IV Theory and History of Architecture III
APC418P	Advanced Professional Practice IV	(8)	(12)	Professional Practice IV
TOTAL CREDITS FOR THE FOURTH YEAR FOR OPTION 2:			**120**	
TOTAL CREDITS FOR THE QUALIFICATION:			**480**	

1.2 BACHELOR OF ARCHITECTURE

(Extended curriculum programme with foundation provision)

BArch - NQF Level 8 (480 credits)

(Fields of specialisation: Design or Technology)

Qualification type: Professional Bachelor's Degree

Qualification code: BPARF2

SAQA ID: 110794, CHE NUMBER: H/H16/10740/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate with a matriculation endorsement (**or** an equivalent qualification), with a D symbol (50 – 59%) at Higher Grade or a C symbol (60 – 69%) at Standard Grade for English.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **25** (six subjects).

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate, with a bachelor's degree endorsement (four subjects with a minimum score of 4 in the subjects), or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language).

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **25** (excluding Life Orientation).

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least 50% (APS of 4) for English (first additional language), 50% (APS of 4) for Mathematics or Mathematical Literacy, 50% for Life Orientation (excluded for APS calculation) and at least 60% (APS of 5) for any four other vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **25** (excluding Life Orientation).

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

  The applicant will be considered for admission to the programme if a qualification is in Architecture or Architectural Technology or a related field of study on NQF Level 5 or above with an average of at least 60% for all modules completed.

Selection criteria:
Admission will be based on academic performance; availability of space; and an interview.

b. Assessment procedure(s):
After passing the initial administrative screening, all applicants will sit for an additional assessment arranged with the Department. The purpose of the assessment is to select only those applicants who are most likely to be successful in their studies in Architecture. Preference would be given to first-time entering students. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Information pertaining to the assessment is available on the Department's website: www.tutarchitecture.co.za.

Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes. Classes and assessments may take place on Friday afternoons and/or Saturdays.

f. Minimum duration:
Five years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Class timetables and class times:
Students will only be permitted to register for modules in different year groups if the scheduled contact sessions for those modules do not coincide. Students should therefore take note of scheduled contact sessions and class times before registering.

i. Generic requirements:
The modules taught in each year have been put together in order to provide the student with the necessary platform of skills, knowledge and mindset to enable them to solve the problems that they will encounter during that year of study. It is one package designed to work together to promote horizontal integration. If any part of that package of knowledge, skills and mindset is missing or lacking, the platform to progress to the next level of complexity is flawed and will eventually have a detrimental effect on subsequent development.

Students should attempt to enrol for all modules offered in a particular year for reasons of horizontal integration. Students who do not wish to enrol for all the modules for a specific year, but only for some of them, are subject to the combinations and sequences as explained in the curriculum of each year and the Head of the Department must give permission in these instances.

The Department is of the opinion that any student who does not hand in any two consecutive assignments or does not hand in any three assignments has not shown sufficient attendance as contemplated in rules 14.3 and 14.4(a) of the Students' Rules and Regulations (Part 1). Such a student will not be allowed entry to the final portfolio or oral examinations in these modules/subjects. Such students will be considered to have deregistered these modules/subjects in terms of rule 14.4(c) of the Students' Rules and Regulations (Part 1).

Prerequisite modules will only be waived in highly exceptional cases, based on a motivation by the Head of the Department and approved by the Executive Dean.

j. Degree validation and accreditation:
The South African Council for the Architectural Profession (SACAP) accredits both the fifth-year specialisation options for registration in the SACAP category of Candidate Senior Technologist. The qualification is internationally validated through the Canberra Accord (CA). The CA facilitates the portability of educational credentials amongst participating member countries by recognising the similarity of professional architecture degrees. CA signatories include Canada, China, Korea, Mexico, South Africa, the USA and a further 35 countries represented by the Commonwealth Association of Architects (CAA).

CURRICULUM

FIRST YEAR
Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- ACDF05P and ALPF05P
- ACDF05P and FDTF25P
- ACDF05P and CSTF05P
- PFRF25P and CSTF05P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
- ALPF05P may not precede ACDF05P, because ALPF05P is based on ACDF05P.
- If ACDF05P was passed previously, a student may continue with ALPF05P.
- FDTF25P may not precede ACDF05P, because FDTF25P is based on ACDF05P.
- If ACDF05P was passed previously, a student may continue with FDTF25P.
- CSTF05P may not precede ACDF05P, because CSTF05P is based on ACDF05P. If ACDF05P was passed previously, a student may continue with CSTF05P.
- PFRF25P may not precede ACDF05P, because PFRF25P is integrated with ACDF05P. If PFRF25P was passed previously, a student may continue with CSTF05P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ACDF05P	Foundation Architectural Design I	(5)	(24)	
ALPF05P	Foundation Architectural Language and Presentation Techniques I	(5)	(12)	
CSTF05P	Foundation Construction I	(5)	(12)	
FDTF25P	Foundation Technical Architectural Drawing I (block module)	(5)	(6)	
PFRF25P	Foundation Professional Practice I (block module, offered in the first semester)	(5)	(6)	
TOTAL CREDITS FOR THE FIRST YEAR:			**60**	

SECOND YEAR
Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- ACD005P and THR005P
- ACD005P and CST005P
- BPS005P and CST005P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
- THR005P may not precede ACD005P, because THR005P is integrated with ACD005P. If THR005P has been passed previously, a student may continue with ACD005P.
- CST005P may not precede ACD005P, because CST005P is based on ACD005P. If ACD005P was passed previously, a student may continue with CST005P.

- BPS005P may not precede CST005P, because BPS005P is based on CST005P. If BPS005P was passed previously, a student may continue with CST005P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ACD005P	Architectural Design I	(5)	(24)	Foundation Architectural Design I
BPS005P	Building Physics and Systems Design I	(5)	(6)	
CAR025P	Computer Applications in Architecture I (block-module)	(5)	(6)	
CST005P	Construction I	(5)	(9)	Foundation Construction I
PFR025P	Professional Practice I (block module, offered in the first semester)	(5)	(3)	Foundation Professional Practice I
PTR005P	Presentation Techniques I	(5)	(6)	Foundation Architectural Language and Presentation Techniques I
THR005P	Theory and History of Architecture I	(5)	(6)	
TOTAL CREDITS FOR THE SECOND YEAR:			**60**	

THIRD YEAR
Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- ACD216P and THR216P
- ACD216P and CST216P
- BPS216P and CST216P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
- THR216P may not precede ACD216P, because THR216P is integrated with ACD216P. If THR216P has been passed previously, a student may continue with ACD216P.
- CST216P may not precede ACD216P, because CST216P is based on ACD216P. If ACD216P was passed previously, a student may continue with CST216P.
- BPS216P may not precede CST216P, because BPS216P is based on CST216P. If BPS216P was passed previously, a student may continue with CST216P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
FIRST OR SECOND SEMESTER				
ACD216P	Architectural Design II	(6)	(48)	Architectural Design I Construction I Theory and History of Architecture I
BPS216P	Building Physics and Systems Design II	(6)	(6)	Building Physics and Systems Design I
CAR226P	Computer Applications in Architecture II (block-module)	(6)	(6)	Computer Applications in Architecture I
CST216P	Construction II	(6)	(12)	Architectural Design I Construction I Theory and History of Architecture I
PFR216P	Professional Practice II	(6)	(36)	Professional Practice I
THR216P	Theory and History of Architecture II	(6)	(12)	Architectural Design I Construction I Theory and History of Architecture I
TOTAL CREDITS FOR THE THIRD YEAR:			**120**	

FOURTH YEAR
Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- ACD307P and THR307P
- ACD307P and CST307P
- BPS307P and CST307P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
- THR307P may not precede ACD307P, because THR307P is integrated with ACD307P. If THR307P has been passed previously, a student may continue with ACD307P.
- CST307P may not precede ACD307P, because CST307P is based on ACD307P. If ACD307P was passed previously, a student may continue with CST307P.
- BPS307P may not precede CST307P, because BPS307P is based on CST307P. If BPS307P was passed previously, a student may continue with CST307P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ACD307P	Architectural Design III	(7)	(54)	Architectural Design II Construction II Theory and History of Architecture II
BPS307P	Building Physics and Systems Design III	(7)	(12)	Building Physics and Systems Design II
CAR327P	Computer Applications in Architecture III (block-module)	(7)	(18)	Computer Applications in Architecture II
CST307P	Construction III	(7)	(18)	Architectural Design II Construction II Theory and History of Architecture II
PFR327P	Professional Practice III (block module)	(7)	(6)	Professional Practice II
THR307P	Theory and History of Architecture III	(7)	(12)	Architectural Design II Construction II Theory and History of Architecture II
TOTAL CREDITS FOR THE FOURTH YEAR:			**120**	

FIFTH YEAR
One of the following options (as determined by the Head of the Department):

OPTION 1: ARCHITECTURAL DESIGN:
In order to continue with this option, a student must obtain a minimum mark of 70% in the final examination for Architectural Design III. Should he/she not meet this requirement, he/she will only be allowed to continue with this option if recommended by the examination panel for Architectural Design III and Theory and History of Architecture III and the subsequent endorsement by the Head of the Department.

Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- ACD408P and THR408P
- ACD408P and CST418P
- BPS418P and CST418P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
- THR408P may not precede ACD408P, because THR408P is integrated with ACD408P. If THR408P has been passed previously, a student may continue with ACD408P.
- CST418P may not precede ACD408P, because CST418P is based on ACD408P. If ACD408P was passed previously, a student may continue with CST418P.
- BPS418P may not precede CST418P, because BPS418P is based on CST418P. If BPS418P was passed previously, a student may continue with CST418P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ACD408P	Architectural Design IV	(8)	(54)	Architectural Design III Construction III Theory and History of Architecture III
CAR428P	Computer Applications in Architecture IV (block-module)	(8)	(12)	Computer Applications in Architecture III
THR408P	Theory and History of Architecture IV	(8)	(12)	Architectural Design III Construction III Theory and History of Architecture III

FIRST SEMESTER

BPS418P	Building Physics and Systems Design IV	(8)	(12)	Building Physics and Systems Design III
CST418P	Construction IV	(8)	(18)	Architectural Design III Construction III Theory and History of Architecture III
PFR418P	Professional Practice IV	(8)	(12)	Professional Practice III
TOTAL CREDITS FOR THE FIFTH YEAR FOR OPTION I:			**120**	

OPTION 2: ARCHITECTURAL TECHNOLOGY:

Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:

- STW408P, CST418P and ACC418P
- STW408P, BPS418P and ABP418P
- CST418P and ACC418P
- BPS418P and ABP418P
- PFR418P and APC418P

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:

- CST418P and ACC418P may not precede STW408P, because CST418P and ACC418P are based on STW408P. If CST418P and/or ACC418P were passed previously, a student may continue with STW408P.
- BPS418P and ABP418P may not precede STW408P, because BPS418P and ABP418P are based on STW408P. If BPS418P and ABP418P were passed previously, a student may continue with STW408P.
- ACC418P may not precede CST418P, because ACC418P is based on CST418P. If ACC418P was passed previously, a student may continue with CST418P.
- APC418P may not precede PFR418P, because APC418P is based on PFR418P. If APC418P was passed previously, a student may continue with PFR418P.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
CAR428P	Computer Applications in Architecture IV (block-module)	(8)	(12)	Computer Applications in Architecture III
STW408P	Studio Work IV	(8)	(30)	Architectural Design III Construction III Theory and History of Architecture III

FIRST SEMESTER

BPS418P	Building Physics and Systems Design IV	(8)	(12)	Building Physics and Systems Design III
CST418P	Construction IV	(8)	(18)	Architectural Design III Construction III Theory and History of Architecture III
PFR418P	Professional Practice IV	(8)	(12)	Professional Practice III

SECOND SEMESTER

ABP418P	Advanced Building Physics and Systems Design IV	(8)	(12)	Building Physics and Systems Design IV Professional Practice IV
ACC418P	Advanced Construction IV	(8)	(12)	Architectural Design III Construction III Construction IV Theory and History of Architecture III
APC418P	Advanced Professional Practice IV	(8)	(12)	Professional Practice IV

TOTAL CREDITS FOR THE FIFTH YEAR FOR OPTION 2: **120**

TOTAL CREDITS FOR THE QUALIFICATION: **480**

1.3 MASTER OF ARCHITECTURE

MArch - NQF Level 9 (180 credits)
Qualification type: Structured Master's Degree
Qualification code: MPAR18
SAQA ID: 110803, CHE NUMBER: H16/10741/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Baccalaureus Technologiae: Architectural Technology (Professional), or Architectural Design (Professional), **or** a Bachelor's degree in Architectural Design (Professional), **or** a Bachelor's Honours degree in Architectural Design (Professional) obtained from an accredited South African university. The applicant should have a minimum grade of 60% for each major module/ subject in the final year of study.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
Candidates who do not meet the 60% minimum academic requirements, may be invited to appear before a Departmental Selection Committee for consideration. Further information regarding the process is available at the Department.

Selection is based on academic performance, the Student Enrolment Plan (SEP), available capacity and the broadening of access. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Day classes, scheduled contact sessions, block-mode classes and research. Classes and assessments may take place on Friday afternoons and/or Saturdays.

f. *Duration:*
A minimum of two years and a maximum of four years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Rules on postgraduate studies:*
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

i. *Accreditation:*
This degree is accredited by the South African Council for the Architectural Profession (SACAP) for registration in the SACAP category of Candidate Architect. The degree is internationally validated through the Canberra Accord (CA). The CA facilitates the portability of educational credentials amongst participating member countries by recognising the similarity of professional architecture degrees. CA signatories include Canada, China, Korea, Mexico, South Africa, the USA and a further 35 countries represented by the Commonwealth Association of Architects (CAA).

CURRICULUM

FIRST YEAR
Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- ACH109M and THD109M
- CHH109M and NSY109M
- CSM109M and KME109M

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
• If THD109M has been passed previously, a student may continue with ACH109M.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ACH109M	Architectural Design V	(9)	(27)	
AHC109M	Architectural Practice V	(9)	(7)	
ARA109M	Advanced Computer Applications V	(9)	(4)	
BMN109M	Business Management V	(9)	(7)	
CHH109M	Computer Hardware V	(9)	(2)	
CSM109M	Construction Materials V	(9)	(7)	
KME109M	Construction Methods V	(9)	(7)	
NSY109M	Network Systems V	(9)	(4)	
THD109M	Theory of Design V	(9)	(7)	
TOTAL CREDITS FOR THE FIRST YEAR:			**72**	

SECOND YEAR
Upon first registration for this academic year, the following modules and their combinations must be taken concurrently:
- ARP209M and RMD209M
- ARP209M/R and CDO209M/R
- CDO209M/R and SFN209M/R

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
- If RMD209M has been passed previously, a student may continue with ARP209M.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ARP209M	Research Report: Architecture: Professional V	(9)	(90)	Architectural Design V
ARP209R	Research Report: Architecture: Professional V (re-registration)	(9)	(0)	
CDO209M	Contract Documentation V	(9)	(10)	
CDO209R	Contract Documentation V (re-registration)	(9)	(0)	
RMD209M	Research Methodology	(9)	(4)	
RMD209R	Research Methodology (re-registration)	(9)	(0)	
SFN209M	Specification V	(9)	(4)	
SFN209R	Specification V (re-registration)	(9)	(0)	
TOTAL CREDITS FOR THE SECOND YEAR:			**108**	
TOTAL CREDITS FOR THE QUALIFICATION:			**180**	

1.4 MASTER OF ARCHITECTURE IN ARCHITECTURAL TECHNOLOGY

MArch (Architectural Technology) - NQF Level 9 (180 credits)
Qualification type: Structured Master's Degree
Qualification code: MAAT18
SAQA ID: 100952, CHE NUMBER: H16/14238/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Baccalaureus Technologiae: Architectural Design (Professional), or Architectural Technology, **or** a Bachelor's degree in Architectural Design (Professional), or Architectural Technology, **or** a Bachelor's Honours degree in Architectural Design (Professional), or Architectural Technology obtained from an accredited South African university. The applicant should have a minimum grade of 60% for each major module/subject in the final year of study.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
Candidates who do not meet the 60% minimum academic requirements, may be invited to appear before a Departmental Selection Committee for consideration. Further information regarding the process is available at the Department.

Selection is based on academic performance, the Student Enrolment Plan (SEP), available capacity and the broadening of access. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Day classes, scheduled contact sessions, block-mode classes and research. Classes and assessments may take place on Friday afternoons and/or Saturdays.

f. *Duration:*
A minimum of two years and a maximum of four years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Rules on postgraduate studies:*
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

i. *Accreditation:*
This degree is accredited by the South African Council for the Architectural Profession (SACAP) for registration in the SACAP category of Candidate Architect. The degree is internationally validated through the Canberra Accord (CA). The CA facilitates the portability of educational credentials amongst participating member countries by recognising the similarity of professional architecture degrees. CA signatories include Canada, China, Korea, Mexico, South Africa, the USA and a further 35 countries represented by the Commonwealth Association of Architects (CAA).

CURRICULUM

FIRST YEAR
Upon first registration for this academic year, the following module and its combinations must be taken concurrently:
- TDO109M and CMR109M
- TDO109M and ESA109M

In the event of failing, non-completion and/or de-registering any of the above modules, the following rule(s) will apply:
• If CMR109M has been passed previously, a student may continue with TDO109M.

CODE	MODULE	NQF-L	CREDIT
CMR109M	Construction Materials and Methods	(9)	(18)
ESA109M	Environmental Science	(9)	(27)
PMA109M	Project Management	(9)	(18)
RAT109M	Research Methodology V	(9)	(9)
RAT109R	Research Methodology V (re-registration)	(9)	(0)
TDO109M	Technical Design Studio	(9)	(18)
TOTAL CREDITS FOR THE FIRST YEAR:			**90**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
ATG109M	Research Report: Architectural Technology: Technology V	(9)	(90)
ATG109R	Research Report: Architectural Technology: Technology V (re-registration)	(9)	(0)
TOTAL CREDITS FOR THE SECOND YEAR:			**90**
TOTAL CREDITS FOR THE QUALIFICATION:			**180**

1.5 DOCTOR OF ARCHITECTURE

DArch - NQF Level 10 (360 credits)
Qualification code: DDAR19
SAQA ID: 101941, CHE NUMBER: H/H16/E054CAN

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
A Magister Technologiae: Architectural Design (Professional), or Architectural Technology, **or** a Master's degree in Architectural Design (Professional), or Architectural Technology, obtained from an accredited South African university. Depending on the nature of the Master's qualification, the completion of certain additional modules/subjects may be required.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
Each application is considered holistically, taking into account the applicant's background, experiences, perspectives, aspirations, values, accomplishments and possible fit within the graduate programme of the Department. Assessments are based on the totality of information available and no single factor is seen as decisive.

The application process evaluates the candidates' previous academic performance; the submitted admissions essay, reference letters, previous experiences in architectural design research or architectural technology research and career objectives.

The interview panel will be looking to identify specific character traits including: honesty, integrity, leadership, teamwork, maturity, creativity and self-direction. The ability to make a positive contribution to society, the profession and the discipline are other important factors.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za. For detailed information on the application process, please contact the Head of the Department.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January and July.

e. Presentation:
Research.

f. Duration:
A minimum of two years and a maximum of five years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Rules on postgraduate studies:
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

CODE	MODULE	NQF-L	CREDIT
AR1010O	Thesis: Architecture	(10)	(360)
AR1010R	Thesis: Architecture (re-registration)	(10)	(0)
AR1110R	Thesis: Architecture (re-registration) (semester option)	(10)	(0)
TOTAL CREDITS FOR THE QUALIFICATION:			**360**

1.6 DIPLOMA IN INDUSTRIAL DESIGN

Dip (Industrial Design) - NQF Level 6 (360 credits)
Qualification code: DIND18
SAQA ID: 96752, CHE NUMBER: H/H16/E012CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate or an equivalent qualification, with a D symbol (50 – 59%) at Higher Grade or a C symbol (60 – 69%) at Standard Grade for English.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **21**.

  Assessment procedure(s):
  All applications meeting the minimum requirements will be required to submit a prescribed portfolio.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate, with a bachelor's degree or a diploma endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language).

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **21** (excluding Life Orientation).

Assessment procedure(s):
All applications meeting the minimum requirements will be required to submit a prescribed portfolio.

Please take note that all completed applications received within the published closing dates will be ranked. Only the top-ranked applicants will be selected according to the Student Enrolment Plan (SEP). Preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

b. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

c. *Intake for the qualification:*
January only.

d. *Presentation:*
Day classes. Classes and assessments may take place on Friday afternoons and/or Saturdays.

e. *Minimum duration:*
Three years.

f. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

g. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a module to be admitted to the examination.

CURRICULUM

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
BMN105D	Business Management I	(5)	(16)	
FHE105D	Freehand Drawing	(5)	(20)	
HTA105D	History of Art and Design	(5)	(20)	
ITD105D	Industrial Design I	(5)	(32)	
FIRST SEMESTER				
MDG115D	Mechanical Engineering Drawing	(5)	(8)	
MUR115D	Manufacturing I	(5)	(8)	
SECOND SEMESTER				
CDD115D	Computer-Aided Design	(5)	(8)	
EGG115D	Engineering Design I	(5)	(8)	
TOTAL CREDITS FOR THE FIRST YEAR:			**120**	

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
BMN206D	Business Management II	(6)	(16)	Business Management I
HOI205D	History of Industrial Design	(5)	(16)	History of Art and Design
ITD206D	Industrial Design II	(6)	(40)	Business Management I Computer-Aided Design Engineering Design I Freehand Drawing History of Art and Design Industrial Design I Manufacturing I Mechanical Engineering Drawing
MIY205D	Material Technology I	(5)	(12)	
PDW206D	Presentation Drawing	(6)	(20)	Freehand Drawing

FIRST SEMESTER

MUR216D	Manufacturing II	(6)	(8)	Manufacturing I Mechanical Engineering Drawing

SECOND SEMESTER

EGG216D	Engineering Design II	(6)	(8)	Computer-Aided Design Engineering Design I

TOTAL CREDITS FOR THE SECOND YEAR: **120**

THIRD YEAR
After completion of all first- and second-year modules.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
BMN306D	Business Management III	(6)	(16)	
DTH306D	Design Theory	(6)	(16)	
ITD306D	Industrial Design III	(6)	(42)	
MIY306D	Material Technology II	(6)	(12)	
MUO306D	Multimedia Presentation	(6)	(20)	

FIRST SEMESTER

ERG316D	Ergonomics	(6)	(6)
MUR316D	Manufacturing III	(6)	(8)

TOTAL CREDITS FOR THE THIRD YEAR: **120**

TOTAL CREDITS FOR THE QUALIFICATION: **360**

1.7 ADVANCED DIPLOMA IN INDUSTRIAL DESIGN

AdvDip (Industrial Design) - NQF Level 7 (120 credits)

Qualification code: ADIN18

SAQA ID: 99377, CHE NUMBER: H/H16/E020CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A National Diploma: Three-Dimensional Design, **or** a Diploma in Industrial Design, **or** a Bachelor's Degree in Industrial Design, **or** an NQF Level 6 qualification in Industrial Design obtained from an accredited South African university, with an average of 60% or more.

Students who are in the process of completing the National Diploma: Three-Dimensional Design or Diploma in Industrial Design at TUT may be considered based on the average of their final year mid-year portfolio assessment, but admission will be subject to the successful completion of the National Diploma: Three-Dimensional Design or Diploma in Industrial Design and the Student Enrolment Plan (SEP).

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
Candidates will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications. Please note that meeting the minimum requirements does not guarantee admission. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes.

f. Minimum duration:
One year.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

YEAR MODULES

CODE	MODULE	NQF-L	CREDIT
DST107V	Design Studies IV	(7)	(20)
PDE107V	Product Design IV	(7)	(100)
TOTAL CREDITS FOR THE QUALIFICATION:			**120**

2. DEPARTMENT OF BUILDING SCIENCES

2.1 DIPLOMA IN BUILDING SCIENCE*

Dip (Building Science) - NQF Level 6 (364 credits)
Qualification code: DPBS25
SAQA ID: 96922, CHE NUMBER: H16/10744/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, and D symbols at Standard Grade or E symbols at Higher Grade for Mathematics and Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **26**.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree or a diploma endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language), 3 for Mathematics or Technical Mathematics, and 3 Physical Sciences or Technical Sciences.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **26** (excluding Life Orientation).

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree or a diploma endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 50% (APS of 4) for Mathematics and Science, and 50% (APS of 4) for any other two compulsory vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **23** (excluding Life Orientation).

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE AS PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

  Admission requirement(s):
  An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

b. *Assessment procedure(s):*
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for this qualification:*
January only.

e. *Presentation:*
Day classes.

f. *Minimum duration:*
Three years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Waiving of prerequisite modules:*
Prerequisites will only be waived in highly exceptional cases, based on a motivation by the Head of the Department and approved by the Executive Dean.

i. *Work-Integrated Learning:*
Students are required to provide acceptable proof of employment before registration. See Chapter 5 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

Key to asterisks:

* Information does not correspond to SAQA registration certificate as per SAQA ID: 96922. (The deviations are pending final approval by SAQA.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ABC105D	Applied Building Science I	(5)	(20)	
BTH105D	Building Technology I*	(5)	(20)	
COL105X	Computer Literacy*	(5)	(5)	
COS105X	Communication Skills*	(5)	(6)*	
CUM105D	Construction Management I	(5)	(20)	
DQU105D	Descriptive Quantification I*	(5)	(20)	
INL125C	Information Literacy* (block module)	(5)	(1)	
LFS125X	Life Skills* (block module)	(5)	(2)	
FIRST OR SECOND SEMESTER				
COI115D	Construction Mathematics*	(5)	(10)	
IMR115D	Introduction to Economics IA (Micro)*	(5)	(10)	
SAI115D	Statistics*	(5)	(10)	
TOTAL CREDITS FOR THE FIRST YEAR:			**124**	

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
FIRST SEMESTER				
BTH215D	Building Technology II*	(5)	(10)	Building Technology I
CUM215D	Construction Management II	(5)	(10)	Construction Management I
DQU215D	Descriptive Quantification II*	(5)	(10)	Descriptive Quantification I
ICL215D	Introduction to Commercial Law*	(5)	(10)	Construction Management I
IMR215D	Introduction to Economics IB (Macro)*	(5)	(10)	Introduction to Economics IA (Micro)
SSV215D	Site Surveying*	(5)	(10)	Construction Mathematics
SECOND SEMESTER				
WBS216D	Work Integrated Learning* *(on completion of all first semester modules)*	(6)	(60)	
TOTAL CREDITS FOR THE SECOND YEAR:			**120**	

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
BCE306D	Building Costing and Estimating III*	(6)	(20)	Descriptive Quantification II
BTH306D	Building Technology III*	(6)	(20)	Building Technology II
CAN306D	Construction Accounting III	(6)	(20)	Introduction to Economics IB (Macro)

CUM306D	Construction Management III	(6)	(20)	Construction Management II
DQU306D	Descriptive Quantification III*	(6)	(20)	Descriptive Quantification II
SAC306D	Structures and Concrete III	(6)	(20)	Construction Mathematics

TOTAL CREDITS FOR THE THIRD YEAR: **120**

TOTAL CREDITS FOR THE QUALIFICATION: **364**

2.2 ADVANCED DIPLOMA IN CONSTRUCTION MANAGEMENT

AdvDip (Construction Management) - NQF Level 7 (120 credits)
Qualification code: ADCG23
SAQA ID: 118399, CHE NUMBER: H/H16/E215CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Diploma in Building Science, **or** a Diploma in Building, **or** a National Diploma: Building, **or** any other NQF Level 6 qualification with 360 credits in a closely related field. An aggregate of 60% or more for any of the mentioned qualifications is required. Candidates should also have an average of 60% or more for each of the following modules: Construction Management III, Construction Technology III or (Building Technology III), Price Analysis and Estimating III (or Building Costing and Estimating III).

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Evening classes.

f. Minimum duration:
A minimum of one or two years (depending on the programme offering).

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

Full-time (evening class) students should register for all modules in one academic year.

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
CCS107V	Construction Contracts and Administration	(7)	(24)
CEC107V	Construction Economics	(7)	(24)
FIRST SEMESTER			
RCG117V	Research Methodology	(7)	(12)
TOTAL CREDITS FOR THE FIRST YEAR:			**60**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
CUM107V	Advanced Construction Management	(7)	(24)
REE107V	Real Estate Studies	(7)	(24)
SECOND SEMESTER			
CSQ117V	Construction Safety and Quality Management	(7)	(12)
TOTAL CREDITS FOR THE SECOND YEAR:			**60**
TOTAL CREDITS FOR THE QUALIFICATION:			**120**

2.3 POSTGRADUATE DIPLOMA IN CONSTRUCTION MANAGEMENT

PGDip (Construction Management) - NQF Level 8 (144 credits)

Qualification code: PDCG25

SAQA ID: 122111, CHE NUMBER: H/H16/E228CAN

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
An Advanced Diploma in Construction Management, **or** an equivalent qualification at NQF Level 7 obtained from an accredited South African university. Candidates should also have an average of 60% or more in the previous qualification.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Evening classes.

f. *Minimum duration:*
One year.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Re-registration:*
A student may re-register for the module Research Report: Construction Management only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the final project only, and not to redo the whole module, should they fail the module.

CURRICULUM

ATTENDANCE

CODE	MODULE	NQF-L	CREDIT
CDU108G	Construction Dispute Resolution	(8)	(24)
CHF108G	Construction Health and Safety Management	(8)	(24)
COJ108G	Construction Project Management	(8)	(24)
FAG108G	Facilities Management	(8)	(24)
RRM108G	Research Report: Construction Management	(8)	(24)
RRM118R	Research Report: Construction Management (re-registration, first-semester module) (see paragraph h)	(8)	(24)
FIRST SEMESTER			
CSG118G	Construction Strategic Management	(8)	(12)
SECOND SEMESTER			
CGR118G	Construction Management Professional Practice	(8)	(12)
TOTAL CREDITS FOR THE QUALIFICATION:			**144**

2.4 ADVANCED DIPLOMA IN QUANTITY SURVEYING

AdvDip (Quantity Surveying) - NQF Level 7 (120 credits)

Qualification code: ADQS23

SAQA ID: 119070, CHE NUMBER: H/H16/E219CAN

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
A Diploma in Building Science, or a Diploma in Building, or a National Diploma: Building, or any other NQF Level 6 qualification with 360 credits in a closely related field. An aggregate of 60% or more for any of the mentioned qualifications is required. Candidates should also have an average of 60% or more for each of the following modules: Quantity Surveying III or (Descriptive Quantification III), Construction Technology III or (Building Technology III), Price Analysis and Estimating III (or Building Costing and Estimating III).

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Evening classes.

f. *Minimum duration:*
A minimum of one or two years (depending on the programme offering).

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

Full-time (evening class) students should register for all modules in one academic year.

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
CCS107V	Construction Contracts and Administration	(7)	(24)
CEC107V	Construction Economics	(7)	(24)

FIRST SEMESTER

RQS117V	Research Methodology: Quantity Surveying	(7)	(12)

TOTAL CREDITS FOR THE FIRST YEAR: **60**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
BDM107V	Business Development and Management	(7)	(24)
DQU107V	Advanced Descriptive Quantification	(7)	(24)

SECOND SEMESTER

PLV117V	Property Law and Valuations	(7)	(12)

TOTAL CREDITS FOR THE SECOND YEAR: **60**

TOTAL CREDITS FOR THE QUALIFICATION: **120**

2.5 POSTGRADUATE DIPLOMA IN QUANTITY SURVEYING

PGDip (Quantity Surveying) - NQF Level 8 (144 credits)
Qualification code: PDQS24
SAQA ID: 119827, CHE NUMBER: H/H16/E227CAN

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
An Advanced Diploma in Quantity Surveying, **or** an equivalent qualification at NQF Level 7 obtained from an accredited South African university. Candidates should also have an average of 65% or more for each of the following modules: Advanced Descriptive Quantification, Construction Contracts and Administration, Construction Economics Property Law and Valuations, and Research Methodology: Quantity Surveying. Candidates will further have to submit a fully pre-approved research proposal compiled during the Advanced Diploma in Quantity Surveying.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Evening classes offered over a period of one or two years.

f. Minimum duration:
A minimum of one or two years (depending on the programme offering).

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may re-register for the module Research Project: Quantity Surveying only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the final project only, and not to redo the whole module, should they fail the module.

CURRICULUM

Full-time (evening class) students should register for all modules in one academic year.

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
CDN108G	Construction Dispute Resolution	(8)	(24)
FCG108G	Facilities Management	(8)	(24)
PJC118G	Project Cost Management (first-semester module)	(8)	(12)
RQS108G	Research Report: Quantity Surveying	(8)	(24)
RQS118R	Research Report: Quantity Surveying (re-registration, first-semester module)	(8)	(0)
TOTAL CREDITS FOR THE FIRST YEAR:			**84**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
CEC108G	Advanced Construction Economics	(8)	(24)
CPJ108G	Construction Project Management	(8)	(24)
QSF118G	Quantity Surveying Professional Practice (second-semester module)	(8)	(12)
TOTAL CREDITS FOR THE SECOND YEAR:			**60**
TOTAL CREDITS FOR THE QUALIFICATION:			**144**

2.6 MASTER OF BUILDING SCIENCE

MBuiSci - NQF Level 9 (180 credits)

Qualification type: Structured Master's Degree

Qualification code: MBSC17

SAQA ID: 96894, CHE NUMBER: H16/10746/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

Admission requirement(s):
A Baccalaureus Technologiae: Construction Management or Quantity Surveying, **or** an NQF Level 8 bachelor's degree, **or** an Honours degree in Construction Management or Quantity Surveying obtained from an accredited South African university, **or** any other relevant NQF Level 8 qualification considered acceptable by the Department.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

Candidates with a baccalaureus technologiae, will be required to complete bridging modules at NQF Level 8 before registration (through an online mode: BPBSO7). The modules are: Engineering Data Analysis (EDY50BN), Life Cycle Management (LCY50BN), and Supply Chain Management (SPP50BN) (or their equivalents). Full-time candidates may apply to complete these bridging modules concurrently with the registered master's degree on approval from the Head of the Department.

Selection criteria:
Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Applicants who do not meet the 60% minimum academic requirement, might be invited for a selection interview with a Departmental Selection Committee.

Assessment procedure(s):
After consideration of the Student Enrolment Plan (SEP), only the top-performing candidates will be selected. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

- **Candidates from South African Universities of Technology:**
  Applications will be assessed against all the admission requirements.

- **Candidates with other and international qualifications:**
  Holders of any other equivalent South African or international bachelor's degree or diplomas, meeting the minimum requirements, will receive a letter inviting them to submit a portfolio, including:
  - A Curriculum Vitae highlighting experience relevant to the field, after completion of the bachelor's degree;
  - Motivation, in no more than one page, stating the reasons for wishing to be admitted;
  - Proof of full academic record; and
  - Evidence of engagement with research, which could include a written report of a scholarly nature; or a literature survey; or a paper presented at a conference or a published article.

Portfolios should be submitted by the due date (as indicated in the letter). The Departmental Selection Committee (at least three staff members of the programme) will assess the portfolios against the criteria as stipulated.

b. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

c. *Intake for the qualification:*
January only.

d. *Presentation:*
Block-mode classes (once a month - Thursdays from 12:00 to 20:00 and Fridays from 08:00 to 16:00) and research.

e. *Duration:*
A minimum of two years and a maximum of four years.

f. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

g. *Rules on postgraduate studies:*
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

YEAR MODULES

CODE	MODULE	NQF-L	CREDIT
CEC109M	Construction Economics V	(9)	(18)
DEM109M	Development Management V	(9)	(18)
RCP109M	Research Report: Building Science V	(9)	(90)
RCP109R	Research Report: Building Science V (re-registration)	(9)	(0)
RCP119R	Research Report: Building Science V (re-registration) (semester option)	(9)	(0)
RMD109M	Research Methodology	(9)	(18)
	plus one of the following electives:		
PRM109M	Project Management V	(9)	(36)
QSU109M	Quantity Surveying V	(9)	(36)

TOTAL CREDITS FOR THE QUALIFICATION: **180**

2.7 MASTER OF BUILDING SCIENCE

MBuiSci - NQF Level 9 (180 credits)

Qualification code: MRBS18

SAQA ID: 96894, CHE NUMBER: H16/15679/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Baccalaureus Technologiae: Construction Management or Quantity Surveying, **or** an NQF Level 8 Bachelor's degree, **or** an Honours degree in Construction Management or Quantity Surveying (or related field), with an aggregate of 60% for the final year of study, obtained from an accredited South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

Candidates with a baccalaureus technologiae, will be required to complete bridging modules at NQF Level 8 before registration (through an online mode: BPBSO7). The modules are: Engineering Data Analysis (EDY50BN), Life Cycle Management (LCY50BN), and Supply Chain Management (SPP50BN) (or their equivalents). Full-time candidates may apply to complete these bridging modules concurrently with the registered master's degree on approval from the Head of the Department.

b. Selection criteria:
Admission will be subject to approval of a research topic by the Departmental Research Committee (DRC). Candidates who do not meet the 60% minimum academic requirements, might be invited to a Departmental Selection Committee for consideration.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January and July.

e. Presentation:
Research.

f. Duration:
A minimum of one year and a maximum of three years.

g. Rules on postgraduate studies:
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

CODE	MODULE	NQF-L	CREDIT
DBS109M	Dissertation: Building Science	(9)	(180)

DBS109R	Dissertation: Building Science (re-registration)	(9)	(0)
DBS119R	Dissertation: Building Science (re-registration) (semester option)	(9)	(0)

TOTAL CREDITS FOR THE QUALIFICATION: **180**

SECTION A2: ENGINEERING PROGRAMMES

1. QUALIFICATIONS OFFERED IN ENGINEERING

Please turn back to the contents (page 5) for an indication of programmes offered.

2. GENERIC STIPULATIONS WITH REGARDS TO THE HIGHER CERTIFICATE IN ENGINEERING:

2.1 The purpose of the programme:

The qualification is primarily vocational or occupational in nature. The qualification also serves to provide students with the basic introductory knowledge, cognitive and conceptual tools and practical skills for further higher education studies in their chosen field of study. The knowledge emphasises general principles and application. This qualification signifies that the student has attained a basic level of higher education knowledge and competence in a particular field or occupation and is capable of applying such knowledge and competence in an occupation or role in the workplace.

2.2 Graduate attributes of the programme:

- **Graduate attribute 1: Problem-solving**
  Apply engineering principles to systematically diagnose and solve narrowly-defined engineering problems.
- **Graduate attribute 2: Application of scientific and engineering knowledge**
  Apply knowledge of mathematics, natural science and engineering sciences to wide practical procedures and practices to solve narrowly-defined engineering problems.
- **Graduate attribute 3: Engineering design**
  Perform procedural design of narrowly-defined components or processes to meet desired needs within applicable standards, codes of practice and legislation.
- **Graduate attribute 4: Investigation**
  Conduct tests, experiments and measurements of narrowly-defined engineering problems by applying relevant codes and manufacturer guidelines.
- **Graduate attribute 5: Engineering methods, skills, tools, including information technology**
  Use appropriate established techniques, resources, and modern engineering tools including information technology for the solution of narrowly-defined engineering problems, with an awareness of the limitations.
- **Graduate attribute 6: Professional and Technical Communication**
  Communicate effectively, both orally and in writing within an engineering context.
- **Graduate attribute 7: Impact of Engineering Activity**
  Demonstrate knowledge and understanding of the impact of engineering activity on society and the environment.

3. GENERIC STIPULATIONS WITH REGARD TO THE BACHELOR OF ENGINEERING TECHNOLOGY AND THE DIPLOMA IN ELECTRICAL ENGINEERING

3.1 The purpose of the programme:

This qualification is primarily industry-oriented. The knowledge emphasises general principles and application or technology transfer. The qualification provides students with a sound knowledge base in a particular field or discipline and the ability to apply their knowledge and skills to particular career or professional contexts, while equipping them to undertake more specialised and intensive learning. Programmes leading to this qualification tend to have a strong professional or career focus and holders of this qualification are normally prepared to enter a specific niche in the labour market.

Specifically, the purpose of educational programmes designed to meet this qualification are to build the necessary knowledge, understanding, abilities and skills required for further learning towards becoming a competent practicing engineering technologist or certificated engineer. This qualification provides -

- Preparation for careers in engineering itself and areas that potentially benefit from engineering skills, for achieving technological proficiency and to make a contribution to the economy and national development;

- The educational base required for registration as a Technician with ECSA (refer to qualification rules - *only applicable to the diploma programme*).
- The educational base required for registration as a Professional Engineering Technologist and/or Certificated Engineer with ECSA (refer to qualification rules - *only applicable to the bachelor of engineering technology programmes*).
- Entry to NQF Level 7 programmes (bachelor of engineering programmes) and then proceed to honours, postgraduate diploma and master's programmes *(only applicable to the diploma programme)*.
- Entry to NQF Level 8 programmes (honours, postgraduate diploma and bachelor of engineering programmes) and then proceed to master's programmes *(only applicable to the bachelor of engineering technology programmes)*.
- For certificated engineers, this provides the education base for achieving proficiency in mining/ factory plant and marine operations and occupational health and safety.

Engineering students completing this qualification will demonstrate competence in all graduate attributes contained in this standard.

3.2 Graduate attributes of the programme:

- **Graduate attribute 1: Problem-solving**
  Apply engineering principles to systematically diagnose and solve broadly-defined engineering problems.
- **Graduate attribute 2: Application of scientific and engineering knowledge**
  Apply knowledge of mathematics, natural science and engineering sciences to the defined and applied engineering procedures, processes, systems and methodologies to solve broadly-defined engineering problems.
- **Graduate attribute 3: Engineering design**
  Perform procedural and non-procedural design of broadly-defined components, systems, works, products or processes to meet desired needs normally within applicable standards, codes of practice and legislation.
- **Graduate attribute 4: Investigation**
  Conduct investigations of broadly-defined problems through locating, searching and selecting relevant data from codes, data bases and literature, designing and conducting experiments, analysing and interpreting results to provide valid conclusions.
- **Graduate attribute 5: Engineering methods, skills, tools, including information technology**
  Use appropriate techniques, resources, and modern engineering tools, including information technology, prediction and modelling, for the solution of broadly-defined engineering problems, with an understanding of the limitations, restrictions, premises, assumptions and constraints.
- **Graduate attribute 6: Professional and Technical Communication**
  Communicate effectively, both orally and in writing, with engineering audiences and the affected parties.
- **Graduate attribute 7: Impact of Engineering Activity**
  Demonstrate knowledge and understanding of the impact of engineering activity on the society, economy, industrial and physical environment, and address issues by analysis and evaluation.
- **Graduate attribute 8: Individual and Teamwork**
  Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects.
- **Graduate attribute 9: Independent Learning**
  Engage in independent and life-long learning through well-developed learning skills.
- **Graduate attribute 10: Engineering Professionalism**
  Comprehend and apply ethical principles and commit to professional ethics, responsibilities and norms of engineering technology practice.

4. GENERIC STIPULATIONS WITH REGARD TO THE NATIONAL DIPLOMA: ENGINEERING (refer to registered qualification standard SAQA ID: 49744)

4.1 The purpose of the programme:

To train technicians in the field of engineering who will meet the criteria for registration as a Professional Engineering Technician at the Engineering Council of South Africa (ECSA). An undergraduate student achieving a qualification will be skilled and competent to solve well-defined problems and to apply the principles of engineering by using both the theoretical and practical knowledge and proven techniques in the execution of technical tasks as per the ethical and professional standards required by the engineering profession in the industry.

4.2 Generic exit-level outcomes of the programme

- **Exit-level outcomes 1: Problem-solving**
  Apply engineering principles to systematically diagnose and solve well-defined engineering problems.
- **Exit-level outcomes 2: Application of scientific and engineering knowledge**
  Demonstrate the application of mathematical, scientific and engineering knowledge in an engineering environment.
- **Exit-level outcomes 3: Engineering design**
  Perform procedural design of well-defined components, systems, works, products or processes to meet desired needs in accordance with applicable standards, codes of practice and legislation.
- **Exit-level outcomes 4: Communication**
  Communicate technical, supervisory and general management information effectively, both orally and in writing, by using appropriate language and terminology, structure, style and graphical support.
- **Exit-level outcomes 5: Engineering management**
  Apply self-management principles and concepts to the development of projects and/or operations in an engineering environment.
- **Exit-level outcomes 6: Application of complementary knowledge**
  Demonstrate a critical awareness of the impact of engineering activity on the social, industrial and physical environment, and of the need to act professionally within own limits of competence.

5. GENERIC STIPULATIONS WITH REGARDS TO THE BACCALAUREUS TECHNOLOGIAE: ENGINEERING (Refer to registered qualification standard SAQA ID: 49509)

5.1 The purpose of the programme:

To develop the necessary knowledge, understanding and skills required for a student's further learning towards becoming a competent practicing engineering technologist. It is intended to subsequently empower a candidate engineering technologist to demonstrate the capability of applying required knowledge, understanding, skills, attitudes and values in the different work environments in South Africa. It is also designed to add value to the qualifying student in terms of enrichment of the person, status and recognition.

5.2 Generic exit-level outcomes of the programme:

- **Exit-level outcomes 1: Problem-solving**
  Apply engineering principles to systematically diagnose and solve broadly-defined engineering problems.
- **Exit-level outcomes 2: Application of scientific and engineering knowledge**
  Demonstrate the application of mathematical, scientific and engineering knowledge in an engineering environment.
- **Exit-level outcomes 3: Engineering design**
  Perform procedural and non-procedural design of broadly-defined components, systems, works, products or processes to meet desired needs in accordance with applicable standards, codes of practice and legislation.
- **Exit-level outcomes 4: Communication**
  Communicate technical, supervisory and general management information effectively, both orally and in writing, by using appropriate language and terminology, structure, style and graphical support.
- **Exit-level outcomes 5: Engineering management**
  Apply engineering management principles and concepts to engineering activities.

- **Exit-level outcomes 6: Project development**
  Identify, analyse, conduct and manage a project.
- **Exit-level outcomes 7: Application of complementary knowledge**
  Demonstrate a critical awareness of the impact of engineering activity on the social, industrial and physical environment, and of the need to act professionally within own limits of competence.

6. CRITICAL CROSS-FIELD OUTCOMES

6.1 The National Diploma and the Baccalaureus Technologiae: Engineering have the following critical cross-field outcomes:

- Identify and solve problems that display responsible decisions, using critical and creative thinking.
- Work effectively with others as a member of a team, group, organisation and community.
- Organise and manage one's activities responsibly and effectively.
- Collect, analyse, organise and critically evaluate information.
- Communicate effectively, using visual, mathematical and/or language skills in the modes of oral and/or written persuasion.
- Use science and technology effectively and critically, showing responsibility towards the environment and health of others.
- Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.
- Contributing to the full personal development of each student and the social and economic development of society at large, by making it an underlying intention of the programme of learning to make an individual aware of:
  - Reflecting on and exploring a variety of strategies to learn more effectively.
  - Participating as responsible citizens in the life of local, national and global communities.
  - Being culturally and aesthetically sensitive across a range of contexts.
  - Exploring education and career opportunities.
  - Develop entrepreneurial opportunities.

7. REGISTRATION WITH ECSA

Successful registration with the Engineering Council of South Africa (ECSA) is based on two pillars:

Stage 1

Accredited Academic Qualification obtained from registered academic providers. This University is a registered provider with the Department of Higher Education and Training. All engineering programmes were taken through a rigorous accreditation process in 2009 to obtain their accreditation status. The National Diploma includes a Work-Integrated Learning component in industry through appropriate cooperative agreements with specific companies in the industrial and service sectors in South Africa. Each programme-specific accreditation status will be published under each programme's information.

Stage 2

Industrial experience of three years for diploma students (candidate technicians), and three years for degree students (candidate technologists), under the supervision of an ECSA-registered professional in the workplace, after the completion of the academic qualification. Students may register with ECSA as candidate technicians after they have qualified for the National Diploma or as Candidate Technologists.

After a student has successfully completed these two stages in his/her career, he/she may apply for professional registration at ECSA. Registration with ECSA gives the qualification international status and recognition in other countries through the current Sydney (Technologists) and Dublin (Technicians) Accords after they have qualified for the Baccalaureus Technologiae: Engineering.

3. DEPARTMENT OF CHEMICAL, METALLURGICAL AND MATERIALS ENGINEERING

3.1 BACHELOR OF ENGINEERING TECHNOLOGY IN CHEMICAL ENGINEERING

BEngTech (Chemical Engineering) - NQF Level 7 (420 credits)
Qualification code: BPHE20
SAQA ID: 110058, CHE NUMBER: H/H16/E110CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate with a matriculation endorsement or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, and B symbols at Standard Grade or C symbols at Higher Grade for Mathematics and Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and 5 for Mathematics or Technical Mathematics, and 5 for Physical Sciences or Technical Sciences.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subjects:
  Engineering Graphics and Design and Mechanical Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics and Science, and 60% (APS of 5) for any other three compulsory vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

Recommended subject(s):
None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

  Admission requirement(s):
  An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

  The applicant will be considered for admission to the programme, if any of the following qualifications has been completed:

  - Higher Certificate in Chemical Engineering (NQF Level 5 - 140 credits): with an average of at least 60% for the qualification.
  - Advanced Certificate in Chemical Engineering (NQF Level 6 - 140 credits): with an average of at least 60% for the qualification.
  - Diploma in Chemical Engineering (NQF Level 6 - 280 credits): with an average of at least 55% for the qualification.
  - National Diploma: Engineering: Chemical (NQF Level 6 - 3,000 credits): with an average of at least 55% for the qualification.

b. *Assessment procedure(s):*
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes.

f. Minimum duration:
Three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may re-register for the module Investigative Project only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the final project only, and not to redo the whole module, should they fail the module.

CURRICULUM

Key to asterisks:
* Information does not correspond to SAQA registration certificate as per SAQA ID: 110058. (The deviations were approved by the Senate meeting of September 2023.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
COL105X	Computer Literacy	(5)	(5)	
COS105X	Communication Skills	(5)	(6)	
EGH105B	Engineering Graphics	(5)	(14)	
INL125C	Information Literacy (block module)	(5)	(1)	
LFS125X	Life Skills (block module)	(5)	(2)	
FIRST SEMESTER				
CF1115B	Chemical Engineering Fundamentals I	(5)	(14)	
EM115AB	Engineering Mathematics IA*	(5)	(14)*	
GPS115B	General Physics	(5)	(14)	
MSC115B	Material Science	(5)	(14)	
SECOND SEMESTER				
CF2115B	Chemical Engineering Fundamentals II	(5)	(14)	Chemical Engineering Fundamentals I
EM115BB	Engineering Mathematics IB*	(5)	(14)*	Engineering Mathematics IA
ORH115B	Organic Chemistry	(5)	(14)	
PHC115B	Physical Chemistry	(5)	(14)	
TOTAL CREDITS FOR THE FIRST YEAR:			**140**	

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EMA206B	Engineering Mathematics II	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
PAS206B	Probability and Statistics	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB

FIRST SEMESTER

CH1216B	Chemical Engineering Thermodynamics I	(6)	(14)	Chemical Engineering Fundamentals II Physical Chemistry
HMT216B	Heat and Mass Transfer Processes	(6)	(14)	Chemical Engineering Fundamentals II
PFF216B	Process Fluid Flow	(6)	(14)	Chemical Engineering Fundamentals II General Physics
SHM216B	Scientific Computing	(6)	(14)	

SECOND SEMESTER

CH2216B	Chemical Engineering Thermodynamics II	(6)	(14)	Chemical Engineering Thermodynamics I
CHP216B	Chemical Process Technology	(6)	(14)	Chemical Engineering Fundamentals II
CPO216B	Chemical Process Optimisation and Control	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
UNO216B	Unit Operations	(6)	(14)	Heat and Mass Transfer Processes

TOTAL CREDITS FOR THE SECOND YEAR: **140**

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
IPJ307B	Investigative Project	(7)	(28)	Chemical Engineering Fundamentals II Chemical Engineering Thermodynamics II Engineering Mathematics IA Engineering Mathematics IB Probability and Statistics Unit Operations
IPJ317R	Investigative Project (re-registration) (first-semester module, see paragraph h)	(7)	(0)	

FIRST SEMESTER

CEE317B	Chemical Engineering Design I (Equipment)	(7)	(14)	Chemical Engineering Thermodynamics II
CR1317B	Chemical Reaction Engineering I	(7)	(14)	Chemical Engineering Thermodynamics II
EES317B	Environmental Engineering and Process Safety	(7)	(14)	Engineering Mathematics IA Engineering Mathematics IB
PRY317B	Particle Technology	(7)	(14)	Engineering Mathematics IA Engineering Mathematics IB

SECOND SEMESTER

CEL317B	Chemical Engineering Design II (Plant)	(7)	(14)	Chemical Engineering Design I (Equipment)
CR2317B	Chemical Reaction Engineering II	(7)	(14)	Chemical Reaction Engineering I
EHE317B	Engineering Practice	(7)	(14)	

FUE317B	Fuel Technology	(7)	(14)	Chemical Engineering Thermodynamics II Organic Chemistry

TOTAL CREDITS FOR THE THIRD YEAR: **140**

TOTAL CREDITS FOR THE QUALIFICATION: **420**

3.2 MASTER OF ENGINEERING IN CHEMICAL ENGINEERING

MEng (Chemical Engineering) - NQF Level 9 (180 credits)
Qualification code: MECE17
SAQA ID: 96896, CHE NUMBER: H16/10749/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Chemical, **or** a Bachelor of Engineering in Chemical Engineering, **or** a Bachelor of Engineering Technology Honours in Chemical Engineering, **or** a Bachelor of Science in Engineering in Chemical Engineering, **or** an NQF Level 8 qualification in Chemical Engineering (or a related field), obtained from a South African university, with an aggregate of 60% for the final year of study.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

Candidates with a baccalaureus technologiae, will be required to complete bridging modules at NQF Level 8 before registration (through an online mode: BPENO4). The modules are: Data Analysis (DAN118N), Research Methodology (REY118N or REL118N) and System Dynamics (SYD118N) (or their equivalents). Full-time candidates may apply to complete these bridging modules concurrently with the registered master's degree on approval from the Head of the Department.

b. *Selection criteria:*
Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Applicants who do not meet the 60% minimum academic requirement, might be invited for a selection interview with a Departmental Selection Committee.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January and July.

e. *Presentation:*
Research.

f. *Duration:*
A minimum of one year and a maximum of three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Rules on postgraduate studies:
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

CODE	MODULE	NQF-L	CREDIT
DCH109M	Dissertation: Engineering: Chemical	(9)	(180)
DCH109R	Dissertation: Engineering: Chemical (re-registration)	(9)	(0)
DCH119R	Dissertation: Engineering: Chemical (re-registration) (semester option)	(9)	(0)

TOTAL CREDITS FOR THE QUALIFICATION: **180**

3.3 BACHELOR OF ENGINEERING TECHNOLOGY IN MATERIALS ENGINEERING IN POLYMER TECHNOLOGY

BEngTech (Materials Engineering) (Polymer Technology) - NQF Level 7 (420 credits)
Qualification code: BPPT20
SAQA ID: 111166, CHE NUMBER: H/H16/E099CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate with a matriculation endorsement or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, and B symbols at Standard Grade or C symbols at Higher Grade for Mathematics and Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and 5 for Mathematics or Technical Mathematics, and 5 for Physical Sciences or Technical Sciences.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

Recommended subjects:
Engineering Graphics and Design and Mechanical Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

Admission requirement(s):
A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics and Science, and 60% (APS of 5) for any other three compulsory vocational subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

Recommended subject(s):
None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

Admission requirement(s):
A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

Recommended subject(s):
None.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

Admission requirement(s):
An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

Recommended subject(s):
None.

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

The applicant will be considered for admission to the programme, if any of the following qualifications has been completed:

- Higher Certificate in Materials Engineering in Polymer Technology (NQF Level 5 - 140 credits): with an average of at least 60% for the qualification.
- Advanced Certificate in Materials Engineering in Polymer Technology (NQF Level 6 - 140 credits): with an average of at least 60% for the qualification.
- Diploma in Materials Engineering in Polymer Technology (NQF Level 6 - 280 credits): with an average of at least 55% for the qualification.
- National Diploma: Polymer Technology (NQF Level 6 - 3,000 credits): with an average of at least 55% for the qualification.

b. Assessment procedure(s):
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes.

f. Minimum duration:
Three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may re-register for the module Plastics Design Project only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the final project only, and not to redo the whole module, should they fail the module.

CURRICULUM

Key to asterisks:
* Information does not correspond to SAQA registration certificate as per SAQA ID: 111166. (The deviations were approved by the Senate meeting of September 2023.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
COL105X	Computer Literacy	(5)	(5)	
COS105X	Communication Skills	(5)	(6)	
EGE105B	Engineering Graphics	(5)	(14)	
INL125C	Information Literacy (block module)	(5)	(1)	
LFS125X	Life Skills (block module)	(5)	(2)	
MEC105B	Mechanics	(5)	(28)	
PTY105B	Plastics Technology	(5)	(28)	
FIRST SEMESTER				
EM115AB	Engineering Mathematics IA*	(5)	(14)*	
ORC115B	Organic Chemistry	(5)	(14)	
SECOND SEMESTER				
EM115BB	Engineering Mathematics IB*	(5)	(14)*	Engineering Mathematics IA

SOA115B	Strength of Material I	(5)	(14)	
TOTAL CREDITS FOR THE FIRST YEAR:			**140**	

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EMA206B	Engineering Mathematics II	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
PAS206B	Probability and Statistics	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
PCO206B	Plastics Conversion I	(6)	(28)	Plastics Technology
PPT206B	Plastics Part and Tool Design	(6)	(28)	Engineering Graphics Plastics Technology
TFL206B	Thermo-Fluids	(6)	(28)	Engineering Mathematics IA Engineering Mathematics IB Mechanics

FIRST SEMESTER

PMI216B	Plastics Material Science I	(6)	(14)	Plastics Technology

SECOND SEMESTER

PYC216B	Polymer Chemistry	(6)	(14)	Organic Chemistry
TOTAL CREDITS FOR THE SECOND YEAR:			**140**	

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
PCO307B	Plastics Conversion II	(7)	(28)	Plastics Conversion I
PDP307B	Plastics Design Project	(7)	(28)	Plastics Part and Tool Design
PDP317R	Plastics Design Project (re-registration) (first-semester module, see paragraph h)	(7)	(0)	
PMI307B	Plastics Material Science II	(7)	(28)	Plastics Material Science I
SOM307B	Strength of Materials II	(7)	(28)	Strength of Material I

FIRST SEMESTER

SPT316B	Scientific Computing	(6)	(14)	

SECOND SEMESTER

EPT317B	Engineering Practice	(7)	(14)	
TOTAL CREDITS FOR THE THIRD YEAR:			**140**	
TOTAL CREDITS FOR THE QUALIFICATION:			**420**	

3.4 BACHELOR OF ENGINEERING TECHNOLOGY HONOURS IN POLYMER TECHNOLOGY

BEngTechHons (Polymer Technology) - NQF Level 8 (140 credits)

Qualification code: BHPT23

SAQA ID: 117944, CHE NUMBER: H/H16/E204CAN

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
A Bachelor of Engineering in Polymer Technology, **or** a Bachelor of Engineering Technology in Materials Engineering in Polymer Technology, **or** a Baccalaureus Technologiae: Polymer Technology, **or** an Advanced Diploma in Polymer Technology, **or** an equivalent qualification with an aggregate of 60% for the final year of study, **or** an NQF Level 7 qualification in a closely related field, obtained from an accredited South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
Admission is subject to selection. Prospective students will be evaluated based on the marks obtained in the previous qualification and/or work experience.

All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Block-mode classes offered over a period of one or two years.

f. *Minimum duration:*
A minimum of one or two years (depending on the programme presentation).

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Re-registration:*
A student may re-register for the module Research Project: Polymer Technology only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the project only, and not to redo it, should they fail the module.

CURRICULUM

Students who register for full-time block-mode classes should register for all modules in one academic year.

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
FIRST SEMESTER			
DAN118S	Data Analysis	(8)	(10)
REY118S	Research Methodology	(8)	(10)
SYD118S	System Dynamics	(8)	(15)
SECOND SEMESTER			
OTY118S	Optimisation Theory	(8)	(15)
SMG118S	Sustainable Management	(8)	(10)
	plus one of the following electives (only CTS116S, EPY116S and ETN116S will be offered until further notice):		
IBO116S	International Business Communication	(6)	(5)
CTS116S	Contracts	(6)	(5)
EGU116S	Engineering Education	(6)	(5)
EPY116S	Energy Economics and Policy	(6)	(5)
ETN116S	Entrepreneurship	(6)	(5)
IND116S	Industrial Design	(6)	(5)
ITR116S	Intellectual Property	(6)	(5)
TOTAL CREDITS FOR THE FIRST YEAR:			**65**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
RPC108S	Research Project: Polymer Technology	(8)	(30)
RPC118R	Research Project: Polymer Technology (re-registration) (first-semester module, see paragraph h)	(8)	(0)
FIRST SEMESTER			
PYT118S	Polymer Materials	(8)	(15)
SYS118S	Polymer Science	(8)	(15)
SECOND SEMESTER			
PYP118S	Polymer Processing	(8)	(15)
TOTAL CREDITS FOR THE SECOND YEAR:			**75**
TOTAL CREDITS FOR THE QUALIFICATION:			**140**

3.5 MASTER OF ENGINEERING IN POLYMER TECHNOLOGY

MEng (Polymer Technology) - NQF Level 9 (180 credits)

Qualification code: MEPT17

SAQA ID: 96919, CHE NUMBER: H16/2180/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
Bachelor of Engineering in Materials Engineering, **or** a Bachelor of Engineering Technology Honours in Materials Engineering, **or** a Bachelor of Science (Engineering) in Materials Engineering, **or** an NQF Level 8 qualification in either Materials Engineering, Chemical Engineering, Mechanical Engineering, Manufacturing Engineering, Metallurgical Engineering (or a related engineering field), obtained from a South African university, with an aggregate of 60% for the final year of study.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

Candidates with a baccalaureus technologiae, will be required to complete bridging modules at NQF Level 8 before registration (through an online mode: BPENO4). The modules are: Data Analysis (DAN118N), Research Methodology (REY118N) and System Dynamics (SYD118N) (or their equivalents). Full-time candidates may apply to complete these bridging modules concurrently with the registered master's degree on approval from the Head of the Department.

b. Selection criteria:
Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Applicants who do not meet the 60% minimum academic requirement, might be invited for a selection interview with a Departmental Selection Committee.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January and July.

e. Presentation:
Research.

f. Duration:
A minimum of one year and a maximum of three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Rules on postgraduate studies:
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

CODE	MODULE	NQF-L	CREDIT
POY109M	Dissertation: Engineering: Polymer Technology	(9)	(180)
POY109R	Dissertation: Engineering: Polymer Technology (re-registration)	(9)	(0)
POY119R	Dissertation: Engineering: Polymer Technology (re-registration) (semester option)	(9)	(0)
TOTAL CREDITS FOR THE QUALIFICATION:			**180**

3.6 BACHELOR OF ENGINEERING TECHNOLOGY IN METALLURGICAL ENGINEERING

BEngTech (Metallurgical Engineering) - NQF Level 7 (420 credits)
Qualification code: BPML20
SAQA ID: 111393, CHE NUMBER: H/H16/E105CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate with a matriculation endorsement or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, and B symbols at Standard Grade or C symbols at Higher Grade for Mathematics and Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and 5 for Mathematics or Technical Mathematics, and 5 for Physical Sciences or Technical Sciences.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subjects:
  Engineering Graphics and Design, and Mechanical Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics and Science, and 60% (APS of 5) for any other three compulsory vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

  Admission requirement(s):
  An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

  The applicant will be considered for admission to the programme, if any of the following qualifications has been completed:
  - Higher Certificate in Metallurgical Engineering (NQF Level 5 - 140 credits): with an average of at least 60% for the qualification.
  - Advanced Certificate in Metallurgical Engineering (NQF Level 6 - 140 credits): with an average of at least 60% for the qualification.
  - Diploma in Metallurgical Engineering (NQF Level 6 - 280 credits): with an average of at least 55% for the qualification.
  - National Diploma: Engineering: Metallurgy (NQF Level 6 - 3,000 credits): with an average of at least 55% for the qualification.

b. Assessment procedure(s):
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes.

f. Minimum duration:
Three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may re-register for the module Project Metallurgy only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the final project only, and not to redo the whole module, should they fail the module.

CURRICULUM

Key to asterisks:

* Information does not correspond to SAQA registration certificate as per SAQA ID: 111393. (The deviations were approved by the Senate meeting of September 2023.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
COL105X	Computer Literacy	(5)	(5)	
COS105X	Communication Skills	(5)	(6)	
EGH105B	Engineering Graphics	(5)	(14)	
INL125C	Information Literacy (block module)	(5)	(1)	
LFS125X	Life Skills (block module)	(5)	(2)	

FIRST SEMESTER

CHE115B	Chemistry	(5)	(14)	
EM115AB	Engineering Mathematics IA*	(5)	(14)*	
GPS115B	General Physics	(5)	(14)	
MMA115B	Metallurgical Materials	(5)	(14)	

SECOND SEMESTER

EM115BB	Engineering Mathematics IB*	(5)	(14)*	Engineering Mathematics IA
MCY115B	Metallurgical Chemistry	(5)	(14)	

MTY115B	Metallurgical Thermodynamics	(5)	(14)	Chemistry
SOT115B	Strength of Materials	(5)	(14)	

TOTAL CREDITS FOR THE FIRST YEAR: **140**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EMA206B	Engineering Mathematics II	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
MIP206B	Mineral Processing	(6)	(28)	
PAS206B	Probability and Statistics	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
PHM206B	Physical Metallurgy	(6)	(28)	Metallurgical Materials

FIRST SEMESTER

RFN216B	Refractory Engineering	(6)	(14)	
SML216B	Scientific Computing	(6)	(14)	

SECOND SEMESTER

HYM216B	Hydrometallurgy	(6)	(14)	Metallurgical Thermodynamics
PYM216B	Pyrometallurgy	(6)	(14)	Metallurgical Chemistry

TOTAL CREDITS FOR THE SECOND YEAR: **140**

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
PDM307B	Production Metallurgy	(7)	(28)	Physical Metallurgy
PMD307B	Process Metallurgy and Design	(7)	(28)	Hydrometallurgy Mineral Processing Pyrometallurgy
PML307B	Project Metallurgy	(7)	(28)	Hydrometallurgy Mineral Processing Physical Metallurgy Pyrometallurgy
PML317R	Project Metallurgy (re-registration) (first-semester module, see paragraph h)	(7)	(0)	

FIRST SEMESTER

ISM317B	Iron and Steel Making	(7)	(14)	
NFM317B	Non-Ferrous Metallurgy	(7)	(14)	Hydrometallurgy

SECOND SEMESTER

COR317B	Corrosion	(7)	(14)	Chemistry
EML317B	Engineering Practice	(7)	(14)	

TOTAL CREDITS FOR THE THIRD YEAR: **140**

TOTAL CREDITS FOR THE QUALIFICATION: **420**

3.7 BACHELOR OF ENGINEERING TECHNOLOGY HONOURS IN METALLURGICAL ENGINEERING

BEngTechHons (Metallurgical Engineering) - NQF Level 8 (140 credits)

Qualification code: BHML23

SAQA ID: 117943, CHE NUMBER: H/H16/E206CAN

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
A Bachelor of Engineering in Metallurgical/Chemical Engineering, **or** a Bachelor of Engineering Technology in Metallurgical/Chemical Engineering, **or** a Baccalaureus Technologiae: Engineering: Metallurgy/Chemical, **or** an Advanced Diploma in Metallurgical Engineering, **or** an equivalent qualification with an aggregate of 60% for the final year of study, or an NQF Level 7 qualification in a closely related field, obtained from an accredited South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
Admission is subject to selection. Prospective students will be evaluated based on the marks obtained in the previous qualification and/or work experience.

All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Block-mode classes offered over a period of one or two years.

f. *Minimum duration:*
A minimum of one or two years (depending on the programme presentation).

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Re-registration:*
A student may re-register for the module Research Project: Metallurgical Engineering only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the project only, and not to redo it, should they fail the module.

CURRICULUM

Students who register for full-time block-mode classes should register for all modules in one academic year.

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
FIRST SEMESTER			
DAN118S	Data Analysis	(8)	(10)
REL118S	Research Methodology	(8)	(10)
SYD118S	System Dynamics	(8)	(15)
SECOND SEMESTER			
OTY118S	Optimisation Theory	(8)	(15)
SMG118S	Sustainable Management	(8)	(10)
	plus one of the following electives (only CTS116S, EPY116S and ETN116S will be offered until further notice):		
IBO116S	International Business Communication	(6)	(5)
CTS116S	Contracts	(6)	(5)
EGU116S	Engineering Education	(6)	(5)
EPY116S	Energy Economics and Policy	(6)	(5)
ETN116S	Entrepreneurship	(6)	(5)
IND116S	Industrial Design	(6)	(5)
ITR116S	Intellectual Property	(6)	(5)
TOTAL CREDITS FOR THE FIRST YEAR:			**65**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
RMY108S	Research Project: Metallurgical Engineering	(8)	(30)
RMY118R	Research Project: Metallurgical Engineering (re-registration) (first-semester module, see paragraph h)	(8)	(0)
FIRST SEMESTER			
EXM118S	Extractive Metallurgy	(8)	(15)
SECOND SEMESTER			
EME118S	Engineering Metallurgy	(8)	(15)
MPG118S	Metallurgical Processes and Plant Design	(8)	(15)
TOTAL CREDITS FOR THE SECOND YEAR:			**75**
TOTAL CREDITS FOR THE QUALIFICATION:			**140**

3.8 MASTER OF ENGINEERING IN METALLURGICAL ENGINEERING

MEng (Metallurgical Engineering) - NQF Level 9 (180 credits)

Qualification code: MEMY17

SAQA ID: 96901, CHE NUMBER: H16/10748/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):

A Baccalaureus Technologiae: Engineering: Metallurgy, **or** a Bachelor of Engineering in Metallurgical Engineering **or** a Bachelor of Engineering Technology Honours in Metallurgical Engineering, **or** a Bachelor of Science in Metallurgical Engineering, **or** an NQF Level 8 qualification in either Metallurgical Engineering, Chemical Engineering, Mechanical Engineering, Materials Engineering, Manufacturing Engineering (or a related engineering field), obtained from a South African university, with an aggregate of 60% for the final year of study.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

Candidates with a baccalaureus technologiae, will be required to complete bridging modules at NQF Level 8 before registration (through an online mode: BPENO4). The modules are: Data Analysis (DAN118N), Research Methodology (REL118N) and System Dynamics (SYD118N) (or their equivalents). Full-time candidates may apply to complete these bridging modules concurrently with the registered master's degree on approval from the Head of the Department.

b. Selection criteria:

Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Applicants who do not meet the 60% minimum academic requirement, might be invited for a selection interview with a Departmental Selection Committee.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:

Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:

January and July.

e. Presentation:

Research.

f. Duration:

A minimum of one year and a maximum of three years.

g. Exclusion and readmission:

See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Rules on postgraduate studies:

See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

CODE	MODULE	NQF-L	CREDIT
MEY109M	Dissertation: Engineering: Metallurgical	(9)	(180)
MEY109R	Dissertation: Engineering: Metallurgical (re-registration)	(9)	(0)
MEY119R	Dissertation: Engineering: Metallurgical (re-registration) (semester option)	(9)	(0)

TOTAL CREDITS FOR THE QUALIFICATION: **180**

3.9 DOCTOR OF ENGINEERING

DEng - NQF Level 10 (360 credits)

Qualification code: DENG17

(Specialisation codes for admission and registration: DECH17 / DEMA17 / DEML17 / DEPO17)

SAQA ID: 96873, CHE NUMBER: H16/10751/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
A Magister Technologiae: Engineering, **or** Master of Engineering, **or** a master's degree at NQF Level 9 in a related field, obtained from a South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
All applications are subject to selection. Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Candidates should submit a copy of at least one scholarly article published or accepted for publication (with proof of acceptance) in a DHET accredited or peer-reviewed journal, and a copy of one scholarly article that has already been submitted for publication in a DHET accredited or peer-reviewed journal (with proof of receipt by the journal). Special cases will be treated on merit by the Faculty Committee for Postgraduate Studies. Candidates who meet the minimum academic requirements might be invited for a personal interview with a Departmental Selection Panel.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January and July.

e. *Presentation:*
Research.

f. *Duration:*
A minimum of two years and a maximum of five years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Rules on postgraduate studies:*
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

The modules offered within the Doctor of Engineering differ between departments. Please refer to the contents (page 5) to see which of the other departments within the faculty offer this programme.

Students register for one of the following specialisation codes:

CODE	MODULE	NQF-L	CREDIT
Chemical Engineering (DECH17)			
CE1010O	Thesis: Engineering: Chemical	(10)	(360)
CE1010R	Thesis: Engineering: Chemical (re-registration)	(10)	(0)
CE1110R	Thesis: Engineering: Chemical (re-registration) (semester option)	(10)	(0)
Materials Engineering (DEMA17)			
MG1010O	Thesis: Engineering: Materials	(10)	(360)
MG1010R	Thesis: Engineering: Materials (re-registration)	(10)	(0)
MG1110R	Thesis: Engineering: Materials (re-registration) (semester option)	(10)	(0)
Metallurgical Engineering (DEML17)			
TE1010O	Thesis: Engineering: Metallurgical	(10)	(360)
TE1010R	Thesis: Engineering: Metallurgical (re-registration)	(10)	(0)
TE1110R	Thesis: Engineering: Metallurgical (re-registration) (semester option)	(10)	(0)
Polymer Engineering (DEPO17)			
PE1010O	Thesis: Engineering: Polymer Technology	(10)	(360)
PE1010R	Thesis: Engineering: Polymer Technology (re-registration)	(10)	(0)
PE1110R	Thesis: Engineering: Polymer Technology (re-registration) (semester option)	(10)	(0)
TOTAL CREDITS FOR THE QUALIFICATION:			**360**

4. DEPARTMENT OF CIVIL ENGINEERING

4.1 HIGHER CERTIFICATE IN CONSTRUCTION ENGINEERING

HCert (Construction Engineering) - NQF Level 5 (140 credits)

Qualification code: HCCE18

(Specialisation code for admission and registration: HCCM18 / HCCW18)

SAQA ID: 97887, CHE NUMBER: H/H16/E034CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate or an equivalent qualification, with C symbols at Standard or D symbols at Higher Grade for English and Mathematics, and a D symbol at Standard Grade or an E symbol at Higher Grade for Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a higher certificate endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and Mathematics or Technical Mathematics, and at least a 3 for Physical Sciences or Technical Sciences.

  Applicants who do not meet the requirements for Mathematics, Physical Sciences, or any of the two additional subjects may enroll for these subjects at any Technical and Vocational Education and Training (TVET) College (see National N Certificate requirements), and if these are successfully passed at a performance level of at least 50%, they may re-apply for admission to the University.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

  Recommended subject(s):
  Civil Technology and Engineering Graphics and Design.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a higher certificate endorsement, with at least 50% (APS of 4) for English (first additional language) and Mathematics, and 50% for Life Orientation (excluded for APS calculation) and 50% (APS of 4) for Science, and any other three compulsory vocational subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

Recommended subject(s):
None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

Admission requirement(s):
A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

Recommended subject(s):
None.

- **FOR APPLICANTS WITH AN N4 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N4:**

Admission requirement(s):
An N4 Certificate in a related Engineering field as published in Report 191: N4, with at least an average of 50% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

b. Assessment procedure(s):
No further assessment will be done (except for candidates with an N4 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes. Classes and assessments may take place on Friday afternoons and/or Saturdays.

f. Minimum duration:
One year.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

ATTENDANCE

CODE	MODULE	NQF-L	CREDIT
CML105X	Computer Literacy	(5)	(10)
COM105X	Communication Skills	(5)	(8)
CPM105C	Construction Management	(5)	(21)
EGC105C	Engineering Graphics	(5)	(14)
EPH105C	Engineering Physics	(5)	(14)
INL125C	Information Literacy (block module)	(5)	(1)
LFS125X	Life Skills (block module)	(5)	(2)
TMA105C	Technical Mathematics	(5)	(21)

plus one of the following options:

Option 1: Construction Material Testing (HCCM18)

FIRST SEMESTER

ENC115C	Engineering Chemistry	(5)	(7)
STC115C	Soil Technology	(5)	(14)

SECOND SEMESTER

BAT115C	Bitumen and Asphalt Technology	(5)	(14)
ECC115C	Concrete and Aggregate Technology	(5)	(14)

Option 2: Water and Wastewater Engineering Infrastructural Operations and Maintenance (HCCW18)

FIRST SEMESTER

ENC115C	Engineering Chemistry	(5)	(7)
WRO115C	Water Reticulation Operation and Maintenance	(5)	(14)

SECOND SEMESTER

WSO115C	Water System Operation and Maintenance	(5)	(14)
WWS115C	Wastewater System Operation and Maintenance	(5)	(14)

TOTAL CREDITS FOR THE QUALIFICATION: **140**

4.2 BACHELOR OF ENGINEERING TECHNOLOGY IN CIVIL ENGINEERING

BEngTech (Civil Engineering) - NQF Level 7 (420 credits)

Qualification code: BPCE18

SAQA ID: 98844, CHE NUMBER: H/H16/E026CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate with a matriculation endorsement or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, and B symbols at Standard Grade or C symbols at Higher Grade for Mathematics and Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and 5 for Mathematics or Technical Mathematics, and 5 for Physical Sciences or Technical Sciences.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subjects:
  Engineering Graphics and Design and Civil Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics and Science, and 60% (APS of 5) for any other three compulsory vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

  Admission requirement(s):
  An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

  The applicant will be considered for admission to the programme, if any of the following qualifications has been completed:

  - Higher Certificate in Construction Engineering (NQF Level 5 - 140 credits): with an average of at least 60% for the qualification, and 60% in each of the following modules: Engineering Graphics, Engineering Physics and Technical Mathematics.
  - Advanced Certificate in Construction or Civil Engineering (NQF Level 6 - 140 credits): with an average of at least 60% for the qualification.
  - Diploma in Civil Engineering Technology (NQF Level 6 - 280 credits): with an average of at least 60% for the qualification.
  - National Diploma: Engineering: Civil (NQF Level 6 - 3,000 credits): with an average of at least 55% for the qualification.

b. *Assessment procedure(s):*
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

Applicants who do not meet the minimum requirements, might be transferred to the Higher Certificate in Construction Engineering, provided that he/she meets the minimum requirements.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes.

f. Minimum duration:
Three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

Key to asterisks:

* Information does not correspond to SAQA registration certificate as per SAQA ID: 98844. (The deviations were approved by the Senate meeting of September 2023.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
COL105X	Computer Literacy	(5)	(5)	
COS105X	Communication Skills	(5)	(6)	
EGC105B	Engineering Graphics	(5)	(14)	
ESU105B	Engineering Surveying	(5)	(28)	
INL125C	Information Literacy (block module)	(5)	(1)	
LFS125X	Life Skills (block module)	(5)	(2)	
SEM105B	Mechanics	(5)	(10)	
FIRST SEMESTER				
CEM115B	Civil Engineering Materials	(5)	(14)	
EM115AB	Engineering Mathematics IA*	(5)	(14)*	
SEP115B	Physics	(5)	(10)	
SECOND SEMESTER				
CSP115B	Construction Principles	(5)	(14)	
EM115BB	Engineering Mathematics IB*	(5)	(14)*	Engineering Mathematics IA
SEH115B	Chemistry	(5)	(8)	
TOTAL CREDITS FOR THE FIRST YEAR:			**140**	

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EMA206B	Engineering Mathematics II	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
PAS206B	Probability and Statistics	(6)	(14)	
FIRST SEMESTER				
GT216CB	Geotechnical Engineering: Geomechanics*	(6)	(14)*	
SA216CB	Structural Analysis and Strength of Materials: Theory of Structures*	(6)	(14)*	Mechanics Physics
TR216CB	Transportation Engineering: Transport Planning I*	(6)	(14)*	

WA216DB	Water Engineering: Hydraulics I*	(6)	(14)*	

SECOND SEMESTER

GT216DB	Geotechnical Engineering: Geotechnical Engineering*	(6)	(14)*	
SA216DB	Structural Analysis and Strength of Materials: Structural Analysis*	(6)	(14)*	Structural Analysis and Strength of Materials: Theory of Structures
TR216DB	Transportation Engineering: Transportation Technology I*	(6)	(14)*	
WA216CB	Water Engineering: Hydrology I*	(6)	(14)*	

TOTAL CREDITS FOR THE SECOND YEAR: **140**

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
CDP307B	Integrated Civil Engineering Design Project *(on completion of all first- and second-year modules)*	(7)	(28)	

FIRST SEMESTER

SCP316B	Scientific Computing	(6)	(14)	
ST317CB	Structural Design: Reinforced Concrete and Masonry*	(7)	(14)*	Structural Analysis and Strength of Materials: Theory of Structures Structural Analysis and Strength of Materials: Structural Analysis
TR317CB	Transportation Engineering: Pavement Technology II*	(7)	(14)*	
WA317CB	Water Engineering: Water and Wastewater Treatment Technology II*	(7)	(14)*	

SECOND SEMESTER

CEP317B	Civil Engineering Practice	(7)	(14)	
ST317DB	Structural Design: Structural Steel and Timber Design*	(7)	(14)*	Structural Analysis and Strength of Materials: Theory of Structures Structural Analysis and Strength of Materials: Structural Analysis
TR317DB	Transportation Engineering: Geometric Design II*	(7)	(14)*	
WA317DB	Water Engineering: Water and Wastewater Reticulation II*	(7)	(14)*	Water Engineering: Hydraulics I

TOTAL CREDITS FOR THE THIRD YEAR: **140**

TOTAL CREDITS FOR THE QUALIFICATION: **420**

4.3 BACHELOR OF ENGINEERING TECHNOLOGY HONOURS IN CIVIL ENGINEERING

BEngTechHons (Civil Engineering) - NQF Level 8 (140 credits)

Qualification code: BHCE24

SAQA ID: 118643, CHE NUMBER: H/H16/E197CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Bachelor of Engineering in Civil Engineering, **or** a Bachelor of Engineering Technology in Civil Engineering, **or** a Baccalaureus Technologiae: Engineering: Civil, **or** an Advanced Diploma in Civil Engineering, **or** an equivalent qualification with an aggregate of 60% for the final year of study, or an NQF Level 7 qualification in a closely related field, obtained from an accredited South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
Admission is subject to selection. Prospective students will be evaluated based on the marks obtained in the previous qualification and/or work experience.

All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Block-mode classes offered over a period of two years.

f. Minimum duration:
A minimum of one or two years (depending on the programme offering).

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may re-register for the module Research Project: Civil Engineering only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the project only, and not to redo it, should they fail the module.

CURRICULUM

Key to asterisks:

* Information does not correspond to SAQA registration certificate as per SAQA ID: 118643. (The deviations are pending final approval by SAQA.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
FIRST SEMESTER			
DAN118S	Data Analysis	(8)	(10)
REV118S	Research Methodology	(8)	(10)
SAS118S	Structural Analysis IV*	(8)	(10)
SECOND SEMESTER			
GTE118S	Geotechnical Engineering IV*	(8)	(10)
SMG118S	Sustainable Management	(8)	(10)
STD118S	Structural Design IV*	(8)	(15)
TOTAL CREDITS FOR THE FIRST YEAR:			**65**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
RCE108S	Research Project: Civil Engineering	(8)	(30)
RCE118R	Research Project: Civil Technology (re-registration) (first-semester module, see paragraph h)	(8)	(0)
FIRST SEMESTER			
WAE118S	Water Engineering IV*	(8)	(25)
SECOND SEMESTER			
TRE118S	Transportation Engineering IV*	(8)	(15)
	plus one of the following electives (only CTS116S, EPY116S and ETN116S will be offered until further notice):		
CTS116S	Contracts	(6)	(5)
EGU116S	Engineering Education	(6)	(5)
EPY116S	Energy Economics and Policy	(6)	(5)
ETN116S	Entrepreneurship	(6)	(5)
IBO116S	International Business Communication	(6)	(5)
IND116S	Industrial Design	(6)	(5)
ITR116S	Intellectual Property	(6)	(5)
TOTAL CREDITS FOR THE SECOND YEAR:			**75**
TOTAL CREDITS FOR THE QUALIFICATION:			**140**

4.4 MASTER OF ENGINEERING IN CIVIL ENGINEERING

MEng (Civil Engineering) - NQF Level 9 (180 credits)

Qualification code: MECI17

SAQA ID: 96897, CHE NUMBER: H16/10753/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Baccalaureus Technologiae: Engineering: Civil, **or** a Bachelor of Engineering in Civil Engineering, **or** a Bachelor of Science in Civil Engineering, **or** a Bachelor of Engineering Technology Honours in Civil Engineering, **or** an NQF Level 8 qualification in Civil Engineering (or a related field), obtained from a South African university, with an aggregate of 60% for the final year of study.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

Candidates with a baccalaureus technologiae, will be required to complete bridging modules at NQF Level 8 before registration (through an online mode: BPENO4). The modules are: Data Analysis (DAN118N), Research Methodology (REV118N) and System Dynamics (SYD118N) (or their equivalents). Full-time candidates may apply to complete these bridging modules concurrently with the registered master's degree on approval from the Head of the Department.

b. Selection criteria:
Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Applicants who do not meet the 60% minimum academic requirement, might be invited for a selection interview with a Departmental Selection Committee.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January and July.

e. Presentation:
Research.

f. Duration:
A minimum of one year and a maximum of three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Rules on postgraduate studies:
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

CODE	MODULE	NQF-L	CREDIT
DEC109M	Dissertation: Engineering: Civil	(9)	(180)
DEC109R	Dissertation: Engineering: Civil (re-registration)	(9)	(0)
DEC119R	Dissertation: Engineering: Civil (re-registration) (semester option)	(9)	(0)

TOTAL CREDITS FOR THE QUALIFICATION: **180**

4.5 DOCTOR OF ENGINEERING

DEng - NQF Level 10 (360 credits)

Qualification code: DENG17

(Specialisation code for admission and registration: DECV17)

SAQA ID: 96873, CHE NUMBER: H16/10751/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Magister Technologiae: Engineering, **or** a Master of Engineering, **or** a master's degree at NQF Level 9 in a related field, obtained from a South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
All applications are subject to selection. Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Candidates should submit a copy of at least one scholarly article published or accepted for publication (with proof of acceptance) in a DHET accredited or peer-reviewed journal, and a copy of one scholarly article that has already been submitted for publication in a DHET accredited or peer-reviewed journal (with proof of receipt by the journal). Special cases will be treated on merit by the Faculty Committee for Postgraduate Studies. Candidates who meet the minimum academic requirements might be invited for a personal interview with a Departmental Selection Panel.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January and July.

e. Presentation:
Research.

f. Duration:
A minimum of two years and a maximum of five years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Rules on postgraduate studies:
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

The modules offered within the Doctor of Engineering differ between departments. Please refer to the contents (page 5) to see which of the other departments within the faculty offer this programme.

Specialisation code DECV17 (Civil Engineering) is offered by this Department:

CODE	MODULE	NQF-L	CREDIT
CI1010O	Thesis: Engineering: Civil	(10)	(360)
CI1010R	Thesis: Engineering: Civil (re-registration)	(10)	(0)
CI1110R	Thesis: Engineering: Civil (re-registration) (semester option)	(10)	(0)
TOTAL CREDITS FOR THE QUALIFICATION:			**360**

5. DEPARTMENT OF ELECTRICAL ENGINEERING

5.1 HIGHER CERTIFICATE IN ELECTRICAL ENGINEERING

HCert (Electrical Engineering) - NQF Level 5 (140 credits)

Qualification code: HCEE18

SAQA ID: 97909, CHE NUMBER: H/H16/E033CAN

Campus where offered: Pretoria and eMalahleni campuses

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate or an equivalent qualification, with C symbols at Standard or D symbols at Higher Grade for English and Mathematics, and a D symbol at Standard Grade or an E symbol at Higher Grade for Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a higher certificate endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and Mathematics or Technical Mathematics, and at least a 3 for Physical Sciences or Technical Sciences.

  Applicants who do not meet the requirements for Mathematics, Physical Sciences, or any of the two additional subjects may enroll for these subjects at any Technical and Vocational Education and Training (TVET) College (see National N Certificate requirements), and if these are successfully passed at a performance level of at least 50%, they may re-apply for admission to the University.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

  Recommended subject(s):
  Electrical Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a higher certificate endorsement, with at least 50% (APS of 4) for English (first additional language) and Mathematics, and 50% for Life Orientation (excluded for APS calculation) and 40% (APS of 3) for Science, and any other three compulsory vocational subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

Recommended subject(s):
Digital Electronics, Electrical Principles and Practice, Electrical Principles and Construction, Electrical Workmanship and Electronic Control.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

Admission requirement(s):
A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

Recommended subject(s):
None.

- **FOR APPLICANTS WITH AN N4 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N4:**

Admission requirement(s):
An N4 Certificate in a related Engineering field as published in Report 191: N4, with at least an average of 50% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

b. Assessment procedure(s):
No further assessment will be done (except for candidates with an N4 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes. Classes and assessments may take place on Friday afternoons and/or Saturdays.

f. Minimum duration:
One year.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

Key to asterisks:

* Information does not correspond to SAQA registration certificate as per SAQA ID: 97909. (The deviations are pending final approval by SAQA.)

ATTENDANCE

CODE	MODULE	NQF-L	CREDIT
CML105X	Computer Literacy	(5)	(10)
COM105X	Communication Skills	(5)	(8)
EGL105C	Engineering Graphics	(5)	(14)
EPH105C	Engineering Physics	(5)	(14)
INL125C	Information Literacy (block module)	(5)	(1)
LFS125X	Life Skills (block module)	(5)	(2)
TMA105C	Technical Mathematics	(5)	(21)

FIRST SEMESTER

EEN115C	Electrical Technology	(5)	(14)
WSP115C	Workshop Practice	(5)	(14)

SECOND SEMESTER

DSY115C	Digital Technology	(5)	(14)
ETY115C	Electronic Technology	(5)	(14)

plus one of the following electives (only ELA115C are offered eMalahleni Campus in 2025):

ATE115C	Autotronic Technology	(5)	(14)
ELA115C	Electronic Assembly	(5)	(14)
ELN115C	Electrical Installation*		
MAD115C	Mobile Applications Development*	(5)	(14)
NTN115C	Network Technology*	(5)	(14)
PVI115C	Photovoltaic Installations*	(5)	(14)

TOTAL CREDITS FOR THE QUALIFICATION: **140**

5.2 DIPLOMA IN ELECTRICAL ENGINEERING

Dip (Electrical Engineering) - NQF Level 6 (360 credits)

Qualification code: DPEE20

SAQA ID: 100953, CHE NUMBER: H16/14240/HEQSF

Campus where offered: Pretoria and eMalahleni campuses

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

Admission requirement(s):
A Senior Certificate or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, Mathematics and Physical Science.

Recommended subject(s):
None.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **26**.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree or a diploma endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language), 4 for Mathematics or Technical Mathematics, and 4 for Physical Sciences or Technical Sciences.

  Recommended subject(s):
  Electrical Technology and Engineering Graphics and Design.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **26** (excluding Life Orientation).

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree or a diploma endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics and Science, and 50% (APS of 4) for any two compulsory vocational subjects.

  Recommended subject(s):
  Electrical Principles and Practice, Electrical Systems and Construction Electrical Workmanship, Electronic Control and Digital Electronics.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **26** (excluding Life Orientation).

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% (APS of 4) for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

  Recommended subject(s):
  Electrical Trade Theory, Electro Technology, Engineering Drawing and Industrial Electronics.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

  Admission requirement(s):
  An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

  The applicant will be considered for admission to the programme, if any of the following qualifications has been completed:

  - Higher Certificate in Electrical Engineering (NQF Level 5 - 140 credits).
  - Advanced Certificate in Electrical Engineering (NQF Level 6 - 140 credits).

b. Assessment procedure(s):
No further assessment will be done (except for candidates with an N4 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

Applicants who do not meet the minimum requirements, might be transferred to the Higher Certificate in Electrical Engineering, provided that he/she meets the minimum requirements.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January and July (July intake is only applicable to Pretoria Campus).

e. Presentation:
Day classes.

f. Minimum duration:
Three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Experiential Learning (Work-Integrated Learning):
A student may only register for Experiential Learning after his or her proposed registration has been approved by the Head of the Department. Simultaneous registration of Experiential Learning with modules offered as day classes may only occur after approval of the Head of the Department, and if it does not interfere with his or her Experiential Learning period. See Chapter 5 of Students' Rules and Regulations (Part 1 of the Prospectus) for further information.

CURRICULUM

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
FIRST SEMESTER				
COL115X	Computer Literacy	(5)	(5)	
COS115X	Communication Skills	(5)	(5)	
DSA115D	Digital Systems IA	(5)	(12)	
EEA115D	Electrical Engineering IA	(5)	(12)	
ETA115D	Electronics IA	(5)	(12)	
LFS125X	Life Skills (block module)	(5)	(2)	
MHA115D	Mathematics IA	(5)	(12)	

SECOND SEMESTER

EEB115D	Electrical Engineering IB	(5)	(12)	Electrical Engineering IA
ETB115D	Electronics IB	(5)	(12)	Electronics IA
MEC115D	Mechanics	(5)	(12)	
MHB115D	Mathematics IB	(5)	(12)	Mathematics IA
SFD115D	Software Design	(5)	(12)	Computer Literacy

TOTAL CREDITS FOR THE FIRST YEAR: **120**

SECOND YEAR

Modules must be taken in the combinations and in the sequence indicated. The following rule will apply:

- Electrical Engineering II and Workshop Practice must be taken concurrently, or Electrical Engineering II should be completed before a student will be permitted to register for Workshop Practice.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
FIRST SEMESTER				
DSB215D	Digital Systems IB	(5)	(12)	Digital Systems IA
EGT216D	Engineering Management	(6)	(12)	
ELE216D	Electrical Engineering II	(6)	(12)	Electrical Engineering IB
MAT216D	Mathematics II	(6)	(12)	Mathematics IB
WSP215D	Workshop Practice	(5)	(12)	
SECOND SEMESTER				
AUT216D	Automation	(6)	(12)	Software Design
CNS216D	Control Systems	(6)	(12)	Mathematics II
EMH216D	Electrical Machines	(6)	(12)	Electrical Engineering II
PJT215D	Projects	(5)	(12)	Digital Systems IB Electrical Engineering II Electronics IB
	plus one of the following specialisation electives:			
CLE216D	Clinical Engineering I (not offered on eMalahleni Campus)	(6)	(12)	Electronics IB
EAP216D	Electronic Application I	(6)	(12)	Electronics IB
EBS216D	Embedded Systems I	(6)	(12)	Digital Systems IB
ECM216D	Electronic Communication I	(6)	(12)	Electronics IB
PCI216D	Process Instrumentation I	(6)	(12)	Mechanics
PWS216D	Power Systems I	(6)	(12)	Electrical Engineering II

TOTAL CREDITS FOR THE SECOND YEAR: **120**

THIRD YEAR

Modules must be taken in the combinations and in the sequence indicated. The following rule will apply:

- Specialisation modules must be taken concurrently with the Design Projects or the specialisation modules should be passed before a student will be permitted to register for Design Projects.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
FIRST SEMESTER				
DPE316D	Design Projects	(6)	(12)	Projects

PWE316D	Power Electronics	(6)	(12)	Control Systems
REN316D	Renewable Energy	(6)	(12)	Electrical Engineering II

plus one of the following specialisation electives:

CLE316D	Clinical Engineering II (not offered on eMalahleni Campus)	(6)	(24)	Clinical Engineering I
EAP316D	Electronic Application II	(6)	(24)	Electronic Application I
EBS316D	Embedded Systems II	(6)	(24)	Embedded Systems I
ECM316D	Electronic Communication II	(6)	(24)	Electronic Communication I
PCI316D	Process Instrumentation II	(6)	(24)	Process Instrumentation I
PWS316D	Power Systems II	(6)	(24)	Power Systems I

SECOND SEMESTER

WEE316D	Experiential Learning	(6)	(60)	Design Projects

TOTAL CREDITS FOR THE THIRD YEAR: **120**

TOTAL CREDITS FOR THE QUALIFICATION: **360**

5.3 ADVANCED DIPLOMA IN ELECTRICAL ENGINEERING

AdvDip (Electrical Engineering) - NQF Level 7 (140 credits)
Qualification code: ADEE23
SAQA ID: 117962, CHE NUMBER: H/H16/E209CAN

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
A Diploma in Electrical Engineering, **or** a National Diploma: Engineering: Electrical from an accredited South African university. Preference will be given to an applicant with an average of 60%, or who is registered as a Professional Engineering Technician in Electrical Engineering or closely related field.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
Admission is subject to selection. All applications received by the published due date will be evaluated according to the marks obtained in the previous related qualification or according to the professional registration. The specific relevant documentation will be requested from applicants and each case will be handled on an individual basis.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP). Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Block-mode classes offered in pre-determined blocks on Saturdays.

f. *Minimum duration:*
Two years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Re-registration:*
A student may re-register for the module Industrial Project only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the project only, and not to redo it, should they fail the module.

CURRICULUM

Modules are offered as determined by the Head of the Department.

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
FIRST SEMESTER			
EGT117V	Engineering Management	(7)	(14)
MAT117V	Mathematics	(7)	(14)
SECOND SEMESTER			
CNS117V	Control Systems	(7)	(14)
EFW117V	Electromagnetic Fields and Waves	(7)	(7)
MMF117V	Man-Machine Interface	(7)	(7)
TOTAL CREDITS FOR THE FIRST YEAR:			**56**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
IEE107V	Industrial Project *(after completing at least 42 credits in the first year)*	(7)	(28)
IEE117R	Industrial Project (re-registration) (first-semester module, see paragraph h)	(7)	(0)
FIRST SEMESTER			
EBS117V	Embedded Systems	(7)	(14)
SPR117V	Signal Processing	(7)	(14)
SECOND SEMESTER			
CVS117V	Conversion Systems	(7)	(14)
	plus one of the following electives as determined by the Head of the Department:		
CLE117V	Clinical Engineering	(7)	(14)
EAP117V	Electronic Applications	(7)	(14)
ECM117V	Electronic Communication	(7)	(14)

IAU117V	Industrial Automation	(7)	(14)
PAS117V	Probability and Statistics	(7)	(14)
PWE117V	Power Electronics	(7)	(14)
PWS117V	Power Systems	(7)	(14)
SFD117V	Software Design	(7)	(14)

TOTAL CREDITS FOR THE SECOND YEAR: **84**

TOTAL CREDITS FOR THE QUALIFICATION: **140**

5.4 BACHELOR OF ENGINEERING TECHNOLOGY IN ELECTRICAL ENGINEERING

BEngTech (Electrical Engineering) - NQF Level 7 (420 credits)

Qualification code: BPEE19

SAQA ID: 101903, CHE NUMBER: H/H16/E022CAN

Campus where offered: Pretoria and eMalahleni campuses

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate with a matriculation endorsement or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, and B symbols at Standard Grade or C symbols at Higher Grade for Mathematics and Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **30**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and 5 for Mathematics or Technical Mathematics, 5 for Physical Sciences or Technical Sciences and at least 4 for any three additional subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **30** (excluding Life Orientation).

  Recommended subjects:
  Engineering Graphics and Design and Electrical Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics and Science, and 60% (APS of 5) for any other three compulsory vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

  Admission requirement(s):
  An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

  Please note that admission will be based on academic performance; availability of space; and an interview.

  The applicant will be considered for admission to the programme, if any of the following qualifications has been completed:

  - Higher Certificate in Electrical Engineering (NQF Level 5 - 140 credits): with an average of at least 60% for the qualification, and 60% in each of the following modules: Electrical Technology, Electronic Technology, Digital Technology, Physics, Technical Mathematics and the chosen elective(s).
  - Advanced Certificate in Electrical Engineering (NQF Level 6 - 140 credits): with an average of at least 60% for the qualification.
  - Diploma in Electrical Engineering Technology (NQF Level 6 - 280 credits): with an average of at least 60% for the qualification.
  - Diploma in Electrical Engineering (NQF Level 6 - 360 credits).
  - National Diploma: Engineering: Electrical (NQF Level 6 - 3,000 credits).

b. *Assessment procedure(s):*
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

Applicants who do not meet the minimum requirements, might be transferred to the Higher Certificate in Electrical Engineering, provided that he/she meets the minimum requirements.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Day classes.

f. *Minimum duration:*
Three years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

Key to asterisks:

* Information does not correspond to SAQA registration certificate as per SAQA ID: 101903. (The deviations were approved by the Senate meeting of September 2023 and November 2023.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
1EM105B	Mechanics	(5)	(10)	
COL105X	Computer Literacy	(5)	(5)	
COS105X	Communication Skills	(5)	(6)	
EGE105B	Engineering Graphics	(5)	(14)	
ELC105B	Electrical Circuits	(5)	(28)	
ELS105B	Electronic Circuits	(5)	(28)	
INL125C	Information Literacy (block module)	(5)	(1)	
LFS125X	Life Skills (block module)	(5)	(2)	
FIRST SEMESTER				
EM115AB	Engineering Mathematics IA*	(5)	(14)*	
SEP115B	Physics	(5)	(10)	
SECOND SEMESTER				
EM115BB	Engineering Mathematics IB*	(5)	(14)*	Engineering Mathematics IA
SEC115B	Chemistry	(5)	(8)	
TOTAL CREDITS FOR THE FIRST YEAR:			**140**	

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EMA206B	Engineering Mathematics II	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
PAS206B	Probability and Statistics	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
FIRST SEMESTER				
AUT216B	Automation	(6)	(14)	Computer Literacy
CVS216B	Conversion Systems	(6)	(14)	Electrical Circuits Engineering Mathematics IA Engineering Mathematics IB
EB216AB	Embedded Systems A*	(6)	(14)*	Electronic Circuits
ES216AB	Engineering Software Design A*	(6)	(14)*	Computer Literacy
SECOND SEMESTER				
EB216BB	Embedded Systems B*	(6)	(14)*	Embedded Systems A Engineering Software Design A
EFW216B	Electromagnetic Fields and Waves	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB Physics
ES216BB	Engineering Software Design B*	(6)	(14)*	Engineering Software Design A
GES216B	Green Energy Systems	(6)	(14)	Electrical Circuits
TOTAL CREDITS FOR THE SECOND YEAR:			**140**	

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ACS307B	Advanced Conversion Systems	(7)	(28)	Conversion Systems
CNS307B	Control Systems	(7)	(28)	Engineering Mathematics II
PWS307B	Power Systems	(7)	(28)	Conversion Systems
SPR307B	Signal Processing	(7)	(28)	Engineering Mathematics II
FIRST SEMESTER				
AES317B	Advanced Embedded Systems	(7)	(14)	Embedded Systems
SECOND SEMESTER				
EEE317B	Engineering Practice	(7)	(14)	
TOTAL CREDITS FOR THE THIRD YEAR:			**140**	
TOTAL CREDITS FOR THE QUALIFICATION:			**420**	

5.5 BACHELOR OF ENGINEERING TECHNOLOGY HONOURS IN ELECTRICAL ENGINEERING

BEngTechHons (Electrical Engineering) - NQF Level 8 (140 credits)

Qualification code: BHEE22

SAQA ID: 117926, CHE NUMBER: H/H16/E203CAN

Campus where offered: Pretoria and eMalahleni campuses

REMARKS

a. Admission requirement(s):
A Bachelor of Engineering in Electrical Engineering, **or** a Bachelor of Engineering Technology in Electrical Engineering, **or** a Baccalaureus Technologiae: Engineering, **or** an Advanced Diploma in Electrical Engineering, **or** an equivalent qualification with an aggregate of 60% for the final year of study, **or** an NQF Level 7 qualification in a closely related field, obtained from an accredited South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
Admission is subject to selection. Prospective students will be evaluated based on the marks obtained in the previous qualification and/or work experience.

All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January and July.

e. Presentation:
Block-mode classes offered over a period of two years.

f. Minimum duration:
A minimum of one or two years (depending on the programme presentation).

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may re-register for the module Research Project: Electrical Engineering only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the final project only, and not to redo the whole module, should they fail the module.

CURRICULUM

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
FIRST SEMESTER			
1YD118S	System Dynamics	(8)	(15)
DAN118S	Data Analysis	(8)	(10)
REA118S	Research Methodology	(8)	(10)
SECOND SEMESTER			
OTY118S	Optimisation Theory	(8)	(15)
SMG118S	Sustainable Management	(8)	(10)
	Plus a module from any one of the following options (for 2025, only the Control Systems option will be offered):		
Control Systems			
CNS118S	Control Systems	(8)	(15)
Power and Energy Systems			
CVS118S	Conversion Systems	(8)	(15)
Telecommunication Systems			
DCM118S	Digital Communications	(8)	(15)
TOTAL CREDITS FOR THE FIRST YEAR:			**75**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
REG108S	Research Project: Electrical Engineering	(8)	(30)
REG118R	Research Project: Electrical Engineering (re-registration) (first-semester module, see paragraph h)	(8)	(0)
SECOND SEMESTER			
All modules from one of the following options (for 2025, only the Control Systems option will be offered):			
Control Systems			
CIN118S	Computational Intelligence	(8)	(15)
RSY118S	Robotic Systems	(8)	(15)
Power and Energy Systems			
EDM118S	Energy Efficiency and Demand Side Management	(8)	(15)
PDG118S	Power and Distributed Generation	(8)	(15)
Telecommunication Systems			
FNE118S	Fixed Networks	(8)	(15)
WCO118S	Wireless Communications	(8)	(15)

plus one of the following electives (only CTS116S, EPY116S and ETN116S will be offered until further notice):

CTS116S	Contracts	(6)	(5)
EGU116S	Engineering Education	(6)	(5)
EPY116S	Energy Economics and Policy	(6)	(5)
ETN116S	Entrepreneurship	(6)	(5)
IBO116S	International Business Communication	(6)	(5)
IND116S	Industrial Design	(6)	(5)
ITR116S	Intellectual Property	(6)	(5)

TOTAL CREDITS FOR THE SECOND YEAR: **65**

TOTAL CREDITS FOR THE QUALIFICATION: **140**

5.6 MASTER OF ENGINEERING IN ELECTRICAL ENGINEERING

MEng (Electrical Engineering) - NQF Level 9 (180 credits)

Qualification code: MEEE17

SAQA ID: 96898, CHE NUMBER: H16/2217/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):

A Baccalaureus Technologiae: Engineering: Electrical, **or** a Bachelor of Engineering in Electrical Engineering, **or** a Bachelor of Science in Electrical Engineering, **or** a Bachelor of Engineering Technology Honours in Electrical Engineering, **or** an NQF Level 8 qualification in Electrical Engineering (or a related field), obtained from a South African university, with an aggregate of 60% for the final year of study.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

Candidates with a baccalaureus technologiae, will be required to complete bridging modules at NQF Level 8 before registration (through an online mode: BPENO4). The modules are: Data Analysis (DAN118N), Research Methodology (REA118N) and System Dynamics (SYD118N) (or their equivalents). Full-time candidates may apply to complete these bridging modules concurrently with the registered master's degree on approval from the Head of the Department.

b. Selection criteria:

Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Applicants who do not meet the 60% minimum academic requirement, might be invited for a selection interview with a Departmental Selection Committee.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:

Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January and July.

e. Presentation:
Research.

f. Duration:
A minimum of one year and a maximum of three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Rules on postgraduate studies:
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

CODE	MODULE	NQF-L	CREDIT
DEE109M	Dissertation: Engineering: Electrical	(9)	(180)
DEE109R	Dissertation: Engineering: Electrical (re-registration)	(9)	(0)
DEE119R	Dissertation: Engineering: Electrical (re-registration) (semester option)	(9)	(0)

TOTAL CREDITS FOR THE QUALIFICATION: **180**

5.7 DOCTOR OF ENGINEERING

DEng - NQF Level 10 (360 credits)

Qualification code: DENG17

(Specialisation code for admission and registration: DEEL17)

SAQA ID: 96873, CHE NUMBER: H16/10751/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Magister Technologiae: Engineering, **or** Master of Engineering, **or** a master's degree at NQF Level 9 in a related field, obtained from a South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
All applications are subject to selection. Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Candidates should submit a copy of at least one scholarly article published or accepted for publication (with proof of acceptance) in a DHET accredited or peer-reviewed journal, and a copy of one scholarly article that has already been submitted for publication in a DHET accredited or peer-reviewed journal (with proof of receipt by the journal). Special cases will be treated on merit by the Faculty Committee for Postgraduate Studies. Candidates who meet the minimum academic requirements might be invited for a personal interview with a Departmental Selection Panel.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January and July.

e. *Presentation:*
Research.

f. *Duration:*
A minimum of two years and a maximum of five years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Rules on postgraduate studies:*
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

The modules offered within the Doctor of Engineering differ between departments. Please refer to the contents (page 5) to see which of the other departments within the faculty offer this programme.

Specialisation code DEEL17 (Electrical Engineering) is offered by this Department:

CODE	MODULE	NQF-L	CREDIT
EE1010O	Thesis: Engineering: Electrical	(10)	(360)
EE1010R	Thesis: Engineering: Electrical (re-registration)	(10)	(0)
EE1110R	Thesis: Engineering: Electrical (re-registration) (semester option)	(10)	(0)
TOTAL CREDITS FOR THE QUALIFICATION:			**360**

6. DEPARTMENT OF GEOMATICS

6.1 DIPLOMA IN GEOMATICS

Dip (Geomatics) - NQF Level 6 (384 credits)
Qualification code: DPGM23
SAQA ID: 119112, CHE NUMBER: H/H16/E211CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate or an equivalent qualification, with C symbols at Standard Grade or D symbols at Higher Grade for English and Mathematics, and D symbols at Standard Grade or E symbols at Higher Grade for Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **23**.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree or a diploma endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language), 4 for Mathematics or Technical Mathematics, and 3 for Physical Sciences or Technical Sciences.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **23** (excluding Life Orientation).

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree or a diploma endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 50% (APS of 4) for Mathematics and Science, and 50% (APS of 4) for any other two compulsory vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **23** (excluding Life Orientation).

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE AS PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **23** (excluding Life Orientation).

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

  Admission requirement(s):
  An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

b. *Assessment Procedure:*
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Minimum duration:*
Three years.

f. *Presentation:*
Day classes.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
COS105X	Communication Skills	(5)	(6)	
EGP105D	Engineering Surveying Fundamentals I	(5)	(28)	
GOA105D	Geomatics Computer Applications	(5)	(19)	
INL125C	Information Literacy (block module)	(5)	(1)	
LFS125X	Life Skills (block module)	(5)	(2)	

FIRST SEMESTER

GEG115D	Geography	(5)	(6)	
MHA115D	Mathematics IA (first- or second semester module)	(5)	(12)	
PHG115D	Physics	(5)	(10)	

SECOND SEMESTER

CSD115D	Computer Survey Drawing	(5)	(12)	
GOP115D	Geodesy and Map Projections	(5)	(12)	
MHB115D	Mathematics IB (first- or second-semester module)	(5)	(12)	Mathematics IA

TOTAL CREDITS FOR THE FIRST YEAR: **120**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
APG206D	Applied Photogrammetry	(6)	(24)	
EGP206D	Engineering Surveying Fundamentals II	(6)	(24)	Engineering Surveying Fundamentals I
EST206D	Adjustment of Errors and Statistics	(6)	(24)	Engineering Surveying Fundamentals I Mathematics IB
GCP206D	Geomatics Control Project	(6)	(12)	Engineering Surveying Fundamentals I
GIT206D	Geographic Information Systems	(6)	(24)	Geomatics Computer Applications
RSS206D	Remote Sensing	(6)	(24)	

SECOND SEMESTER

CDF216D	Cadastral Systems Fundamentals	(6)	(12)	

TOTAL CREDITS FOR THE SECOND YEAR: **144**

THIRD YEAR
On completion of all modules.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
WGM306D	Work-Integrated Learning: Geomatics	(6)	(120)	

TOTAL CREDITS FOR THE THIRD YEAR: **120**

TOTAL CREDITS FOR THE QUALIFICATION: **384**

6.2 ADVANCED DIPLOMA IN GEOMATICS

AdvDip (Geomatics) - NQF Level 7 (120 credits)
Qualification code: ADGM23
SAQA ID: 118631, CHE NUMBER: H/H16/E214CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Diploma in Geomatics, **or** a National Diploma: Surveying, **or** any other NQF Level 6 qualification with 360 credits in a closely related field. Preference will be given to an applicant with an average of 60%.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
Admission is subject to selection. Prospective students will be evaluated based on the marks obtained in the previous qualification and/or work experience.

All applications received by the published due date will be evaluated and ranked by average subject mark scores from the previous qualification required for admission. After consideration of the Student Enrolment Plan (SEP), preference will be given to applicants with an average of 60% or more to fill the available places.

Candidates who do not meet the 60% requirement will be evaluated by a panel consisting of the Head of the Geomatics Department and two other senior academic staff members in order to be considered for selection. The evaluation will consist of a portfolio of evidence of relevant work experience in engineering surveying (excluding work-integrated learning) and an interview by the panel.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP). Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Block-mode classes offered over a period of two years in pre-determined blocks as determined by the Department.

f. *Minimum duration:*
A minimum of one or two years (depending on the programme presentation).

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

ATTENDANCE 2025

CODE	MODULE	NQF-L	CREDIT
SSY107V	Satellite Surveying and Geodesy	(7)	(24)
FIRST SEMESTER			
GTH117V	Geomatics Technology	(7)	(12)
RGM117V	Research Methodology	(7)	(12)
SECOND SEMESTER			
PSR117V	Project Management - Engineering Surveying	(7)	(12)
TOTAL CREDITS FOR THE YEAR:			**60**

ATTENDANCE 2026

CODE	MODULE	NQF-L	CREDIT
PCS107V	Precise Engineering Surveying	(7)	(24)
FIRST SEMESTER			
GDE117V	Geometric Design	(7)	(12)
GIF117V	Geographic Information Sciences	(7)	(12)
SECOND SEMESTER			
GPM117V	Geomatics Practice Management and Ethics	(7)	(12)
TOTAL CREDITS FOR THE YEAR:			**60**
TOTAL CREDITS FOR THE QUALIFICATION:			**120**

6.3 POSTGRADUATE DIPLOMA IN GEOMATICS

PGDip (Geomatics) - NQF Level 8 (124 credits)

Qualification code: PDGM24

SAQA ID: 119822, CHE NUMBER: H/H16/E226CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):

An Advanced Diploma in Geomatics, **or** a Baccalaureus Technologiae: Surveying, **or** a Bachelor of Geomatics, **or** an equivalent NQF level 7 qualification in a closely related field. Preference will be given to applicants with an average of 60% or more.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:

Admission is subject to selection. All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not meet the 60% requirement. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

Candidates who do not meet the 60% requirement will be evaluated by a panel consisting the Head of the Department and two other senior academic staff members in order to be considered for selection. The evaluation will consist of a portfolio of evidence of relevant work experience in engineering surveying (excluding work-integrated learning) and an interview by the panel.

c. Recognition of Prior Learning (RPL), equivalence and status:

Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Block-mode classes.

f. Minimum duration:
One year.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may re-register for the module Geomatics Project Engineering Surveying only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the final project only, and not to redo the whole module, should they fail the module.

CURRICULUM

SEMESTER MODULES

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
FIRST SEMESTER				
ASG118G	Advanced Satellite Surveying and Geodesy	(8)	(12)	
ATS118G	Advanced Theory of Survey Adjustments	(8)	(12)	
GDS118G	Geomatics Data Science and Technology	(8)	(12)	
PC1118G	Advanced Precise Engineering Surveying I	(8)	(12)	
RGM118G	Research Methodology	(8)	(10)	
SECOND SEMESTER				
GLE118G	Geomatics Law and Entrepreneurship	(8)	(12)	
GPE118G	Geomatics Project Engineering Surveying	(8)	(30)	Research Methodology
GPE118R	Geomatics Project Engineering Surveying (re-registration, first-semester module)	(8)	(0)	
LMS118G	Land Management and Spatial Planning	(8)	(12)	
PC2118G	Advanced Precise Engineering Surveying II	(8)	(12)	Advanced Precise Engineering Surveying I
TOTAL CREDITS FOR THE QUALIFICATION:			**124**	

6.4 BACHELOR OF GEOMATICS

BGeomatics - NQF Level 7 (386 credits)

Qualification code: BPGM20

SAQA ID: 112138, CHE NUMBER: H/H16/E113CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate with a matriculation endorsement or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English and Physical Science, and a B symbol at Standard Grade or a C symbol at Higher Grade for Mathematics.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **25**.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language), 5 for Mathematics or Technical Mathematics, and 4 for Physical Sciences or Technical Sciences.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **25** (excluding Life Orientation).

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics, 50% (APS of 4) for Science, and 60% (APS of 5) for any other three compulsory vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **25** (excluding Life Orientation).

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE AS PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **25**.

Recommended subject(s):
None.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

Admission requirement(s):
An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

Recommended subject(s):
None.

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

The applicant will be considered for admission to the programme, if any of the following qualifications have been completed with an average of at least 60% for the qualification:

- Diploma in Geomatics (NQF Level 6 - 360 credits).
- National Diploma: Surveying (NQF Level 6 - 3,000 credits).

b. Assessment procedure(s):
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes.

f. Minimum duration:
Three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may only re-register for Engineering Surveying Project with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the final project only, and not to redo the whole module, should they fail the module.

CURRICULUM

Key to asterisks:

* Information does not correspond to SAQA registration certificate as per SAQA ID: 112138. (The deviations were approved by the Senate meeting of September 2023.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
COS105X	Communication Skills	(5)	(6)	
EGP105B	Engineering Surveying Fundamentals	(5)	(28)	
GOA105B	Geomatics Computer Applications	(5)	(19)	
INL125C	Information Literacy (block module)	(5)	(1)	
LFS125X	Life Skills (block module)	(5)	(2)	
FIRST SEMESTER				
EM115AB	Engineering Mathematics IA* (first- or second-semester module)	(5)	(14)*	
GEG115B	Geography	(5)	(6)	
SEP115B	Physics	(5)	(10)	
SECOND SEMESTER				
CSD115B	Computer Survey Drawing	(5)	(12)	
EM115BB	Engineering Mathematics IB* (first- or second-semester module)	(5)	(14)*	Engineering Mathematics IA
GOP115B	Geodesy and Map Projection I	(5)	(12)	
MEC115B	Mechanics	(5)	(10)	
TOTAL CREDITS FOR THE FIRST YEAR:			**134**	

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
APG206B	Photogrammetry I	(6)	(24)	
CSL206B	Adjustment Computations and Statistical Analysis	(6)	(24)	Engineering Mathematics IA Engineering Mathematics IB Engineering Surveying Fundamentals
EMA206B	Engineering Mathematics II	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
ESR206B	Engineering Surveying I	(6)	(28)	Engineering Surveying Fundamentals
GIT206B	Geographic Information Technology I	(6)	(24)	Geomatics Computer Applications
SECOND SEMESTER				
CDS216B	Cadastral Systems	(6)	(12)	
TOTAL CREDITS FOR THE SECOND YEAR:			**126**	

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
ESR307B	Engineering Surveying II	(7)	(24)	Engineering Surveying I
RSS307B	Remote Sensing I	(7)	(24)	Photogrammetry I
FIRST SEMESTER				
APG317B	Photogrammetry II	(7)	(12)	Photogrammetry I
GOP317B	Geodesy and Map Projections II	(7)	(18)	
PRS317B	Project Management: Surveying	(7)	(12)	
SECOND SEMESTER				
ESP317B	Engineering Surveying Project	(7)	(12)	Adjustment Computations and Statistical Analysis Engineering Surveying I
ESP317R	Engineering Surveying Project (re-registration) (first-semester module, see paragraph h)	(7)	(0)	
GIT317B	Geographic Information Technology II	(7)	(12)	Geographic Information Technology I
RUP317B	Rural and Urban Planning	(7)	(12)	
TOTAL CREDITS FOR THE THIRD YEAR:			**126**	
TOTAL CREDITS FOR THE QUALIFICATION:			**386**	

7. DEPARTMENT OF INDUSTRIAL ENGINEERING

7.1 HIGHER CERTIFICATE IN INDUSTRIAL ENGINEERING

HCert (Industrial Engineering) - NQF Level 5 (140 credits)
Qualification code: HCIE18
SAQA ID: 99013, CHE NUMBER: H/H16/E030CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate or an equivalent qualification, with C symbols at Standard or D symbols at Higher Grade for English and Mathematics, and a D symbol at Standard Grade or an E symbol at Higher Grade for Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a higher certificate endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and Mathematics or Technical Mathematics, and at least a 3 for Physical Sciences or Technical Sciences.

  Applicants who do not meet the requirements for Mathematics, Physical Sciences, or any of the two additional subjects may enroll for these subjects at any Technical and Vocational Education and Training (TVET) College (see National N Certificate requirements), and if these are successfully passed at a performance level of at least 50%, they may re-apply for admission to the University.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

  Recommended subject(s):
  Mechanical Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a higher certificate endorsement, with at least 50% (APS of 4) for English (first additional language) and Mathematics, and 50% for Life Orientation (excluded for APS calculation) and 40% (APS of 3) for Science, and any other three compulsory vocational subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

Recommended subject(s):
None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

Admission requirement(s):
A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

Recommended subject(s):
None.

- **FOR APPLICANTS WITH AN N4 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N4:**

Admission requirement(s):
An N4 Certificate in a related Engineering field as published in Report 191: N4, with at least an average of 50% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

b. Assessment procedure(s):
No further assessment will be done (except for candidates with an N4 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Day classes. Classes and assessments may take place on Friday afternoons and/or Saturdays.

f. Minimum duration:
One year.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

ATTENDANCE

CODE	MODULE	NQF-L	CREDIT
CML105X	Computer Literacy	(5)	(10)
COM105X	Communication Skills	(5)	(8)
EPH105C	Engineering Physics	(5)	(14)
IEP105C	Industrial Engineering Practice	(5)	(28)
INL125C	Information Literacy (block module)	(5)	(1)
LFS125X	Life Skills (block module)	(5)	(2)
TMA105C	Technical Mathematics	(5)	(21)
FIRST SEMESTER			
EGR115C	Engineering Graphics	(5)	(14)
SECOND SEMESTER			
EWP115C	Engineering Work Systems for Process Planning	(5)	(14)
QSP115C	Quality Systems and Process Improvements	(5)	(14)
SAT115C	Statistics	(5)	(14)
TOTAL CREDITS FOR THE QUALIFICATION:			**140**

7.2 BACHELOR OF ENGINEERING TECHNOLOGY IN INDUSTRIAL ENGINEERING

BEngTech (Industrial Engineering) - NQF Level 7 (420 credits)

Qualification code: BPIE19

SAQA ID: 101698, CHE NUMBER: H/H16/E027CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

Admission requirement(s):
A Senior Certificate with a matriculation endorsement or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, and B symbols at Standard Grade or C symbols at Higher Grade for Mathematics and Physical Science.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

Recommended subject(s):
None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and 5 for Mathematics or Technical Mathematics, and 5 for Physical Sciences or Technical Sciences.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subjects:
  Engineering Graphics and Design and Mechanical Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics and Science, and 60% (APS of 5) for any other three compulsory vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

  Admission requirement(s):
  An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

  The applicant will be considered for admission to the programme, if any of the following qualifications has been completed:

  - Higher Certificate in Industrial Engineering (NQF Level 5 - 140 credits): with an average of at least 60% for the qualification and at least 60% for Engineering Graphics, Technical Mathematics and Engineering Physics.
  - Advanced Certificate in Industrial Engineering (NQF Level 6 - 140 credits): with an average of at least 60% for the qualification.
  - Diploma in Industrial Engineering Technology (NQF Level 6 - 280 credits): with an average of at least 55% for the qualification.
  - National Diploma: Engineering: Industrial (NQF Level 6 - 3,000 credits): with an average of at least 55% for the qualification.

b. *Assessment procedure(s):*
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

Applicants who do not meet the minimum requirements, might be transferred to the Higher Certificate in Industrial Engineering, provided that he/she meets the minimum requirements.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Day classes.

f. *Minimum duration:*
Three years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

Key to asterisks:
* Information does not correspond to SAQA registration certificate as per SAQA ID: 101698. (The deviations were approved by the Senate meeting of September 2023 and March 2024.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
COL105X	Computer Literacy	(5)	(5)	
COS105X	Communication Skills	(5)	(6)	
EGE105B	Engineering Graphics	(5)	(14)	
INL125C	Information Literacy (block module)	(5)	(1)	
IWS105B	Industrial Work Systems	(5)	(42)	

LFS125X	Life Skills (block module)	(5)	(2)	

FIRST SEMESTER

EM115AB	Engineering Mathematics IA*	(5)	(14)*	
ME115DB	Mechanics: Electrotechnology*	(5)	(14)*	

SECOND SEMESTER

EM115BB	Engineering Mathematics IB*	(5)	(14)*	Engineering Mathematics IA
ME115CB	Mechanics: Mechanics*	(5)	(14)*	

TOTAL CREDITS FOR THE FIRST YEAR: **126**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EMA206B	Engineering Mathematics II	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
PAA206B	Production and Automation	(6)	(42)	Engineering Mathematics IA Engineering Mathematics IB
PAS206B	Probability and Statistics	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
PRE206B	Production Engineering	(6)	(28)	Engineering Mathematics IA Engineering Mathematics IB

FIRST SEMESTER

OPR216B	Operational Research	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
POE215B	Project Engineering	(5)	(14)	

SECOND SEMESTER

SID216B	Simulation Design	(6)	(14)	Engineering Graphics Engineering Mathematics IA Engineering Mathematics IB
SIE216B	Scientific Computing	(6)	(14)	

TOTAL CREDITS FOR THE SECOND YEAR: **154**

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EBM307B	Engineering Business Management	(7)	(28)	Engineering Mathematics II
IDP307B	Industrial Design Projects	(7)	(28)	Engineering Graphics Project Engineering
QMS307B	Quality Engineering and Management Systems	(7)	(28)	Probability and Statistics
SYE307B	System Engineering	(7)	(28)	Engineering Mathematics II

FIRST SEMESTER

ENI317B	Engineering Practice	(7)	(14)

SECOND SEMESTER

One of the following electives:

AMF317B	Advanced Manufacturing	(7)	(14)	Production and Automation
SCS317B	Supply Chain Systems	(7)	(14)	Production Engineering

TOTAL CREDITS FOR THE THIRD YEAR: **140**

TOTAL CREDITS FOR THE QUALIFICATION: **420**

7.3 BACHELOR OF ENGINEERING TECHNOLOGY HONOURS IN INDUSTRIAL ENGINEERING

BEngTechHons (Industrial Engineering) - NQF Level 8 (140 credits)
Qualification code: BHIE22
SAQA ID: 117942, CHE NUMBER: H/H16/E201CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Bachelor of Engineering in Industrial Engineering, **or** a Bachelor of Engineering Technology in Industrial Engineering, **or** a Baccalaureus Technologiae: Engineering: Industrial, **or** an Advanced Diploma in Industrial Engineering, **or** an equivalent qualification with an aggregate of 60% for the final year of study, **or** an NQF Level 7 qualification in a closely related field, obtained from an accredited South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
Admission is subject to selection. Prospective students will be evaluated based on the marks obtained in the previous qualification and/or work experience.

All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Block-mode classes offered over a period of two years.

f. Minimum duration:
A minimum of one or two years (depending on the programme presentation).

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may re-register for the module Research Project: Industrial Engineering only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the project only, and not to redo it, should they fail the module.

CURRICULUM

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
FIRST SEMESTER			
DAN118S	Data Analysis	(8)	(10)
REI118S	Research Methodology	(8)	(10)
SYD118S	System Dynamics	(8)	(15)
SECOND SEMESTER			
AMF118S	Advanced Manufacturing	(8)	(15)
OMG118S	Operations Management	(8)	(15)
SMG118S	Sustainable Management	(8)	(10)
TOTAL CREDITS FOR THE FIRST YEAR:			**75**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
RIE108S	Research Project: Industrial Engineering	(8)	(30)
RIE118R	Research Project: Industrial Engineering (re-registration) (first-semester module, see paragraph h)	(8)	(0)
FIRST SEMESTER			
AOT118S	Advanced Operational Research	(8)	(15)
SECOND SEMESTER			
QEN118S	Quality Engineering	(8)	(15)
	plus one of the following electives (only CTS116S, EPY116S and ETN116S will be offered until further notice):		
IBO116S	International Business Communication	(6)	(5)
CTS116S	Contracts	(6)	(5)
EGU116S	Engineering Education	(6)	(5)
EPY116S	Energy Economics and Policy	(6)	(5)
ETN116S	Entrepreneurship	(6)	(5)
IND116S	Industrial Design	(6)	(5)

ITR116S	Intellectual Property	(6)	(5)
TOTAL CREDITS FOR THE SECOND YEAR:			**65**
TOTAL CREDITS FOR THE QUALIFICATION:			**140**

7.4 MASTER OF ENGINEERING IN INDUSTRIAL ENGINEERING

MEng (Industrial Engineering) - NQF Level 9 (180 credits)

Qualification code: MEIE18

SAQA ID: 100990, CHE NUMBER: H16/14264/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Baccalaureus Technologiae: Engineering: Industrial, **or** a Bachelor of Engineering in Industrial Engineering, **or** a Bachelor of Science in Industrial Engineering, **or** a Bachelor of Engineering Technology Honours in Industrial Engineering, **or** an NQF Level 8 qualification in Industrial Engineering (or a related field), obtained from an accredited South African university, with an aggregate of 60% for the final year of study.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

Candidates with a baccalaureus technologiae, will be required to complete bridging modules at NQF Level 8 before registration (through an online mode: BPENO4). The modules are: Data Analysis (DAN118N), Research Methodology (REI118N) and System Dynamics (SYD118N) (or their equivalents). Full-time candidates may apply to complete these bridging modules concurrently with the registered master's degree on approval from the Head of the Department.

b. Selection criteria:
Admission will be subject to approval of a research topic by the Departmental Research Committee (DRC). Candidates who do not meet the 60% minimum academic requirements, might be referred to a Departmental Selection Committee for consideration.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January and July.

e. Presentation:
Research.

f. Duration:
A minimum of one year and a maximum of three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Rules on postgraduate studies:
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

CODE	MODULE	NQF-L	CREDIT
INU109M	Dissertation: Engineering: Industrial	(9)	(180)
INU109R	Dissertation: Engineering: Industrial (re-registration)	(9)	(0)
INU119R	Dissertation: Engineering: Industrial (re-registration) (semester option)	(9)	(0)
TOTAL CREDITS FOR THE QUALIFICATION:			**180**

7.5 MASTER OF ENGINEERING MANAGEMENT

MEngineering Management - NQF Level 9 (180 credits)

Qualification code: MEMAO5

SAQA ID: 121067, CHE NUMBER: H/H16/E239CAN

Campus where offered: Pretoria Campus (online)

REMARKS

a. Admission requirement(s):
Any Bachelor Honours in Engineering Technology in Engineering, **or** a Bachelor of Engineering or a Bachelor of Science in Engineering, **or** a NQF Level 8 qualification in Engineering (or related field), obtained from an accredited South African university, with an aggregate of 60% for the final-year of study.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
Admission will be subject to approval of a research topic by the Departmental Research Committee (DRC). Candidates who do not meet the 60% minimum academic requirements, might be referred to a Departmental Selection Committee for consideration.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Only the highest-ranked candidates will be accepted to fill the available places. A waiting list consisting of the remainder of the candidates will provide an opportunity for candidates to fill places created by accepted students failing to meet the enrolment dates. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
Multiple intakes. Please contact the Academic Department for further information on the intake dates.

e. *Presentation:*
Online presentation offered over a period of two years. Modules are presented in a 7-week block format.

f. *Minimum duration:*
Two years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Rules on postgraduate studies:*
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

Key to asterisks:
* Information does not correspond to SAQA registration certificate as per SAQA ID: 121067. (The deviations were approved by the Senate meeting of September 2024.)

FIRST YEAR
Modules are offered as determined by the Head of the Department.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EBU129N	Engineering Business Dynamics	(9)	(15)	
EPJ129N	Engineering Project Management	(9)	(15)	
RP129AN	Research Project Part A*	(9)	(15)*	
SPP129N	Supply Chain Management	(9)	(15)	
	plus four of the following electives:			
AMS129N	Advanced Manufacturing Systems	(9)	(15)	
CUS129N	Construction Management (offered in the second year)	(9)	(15)	
EGM129N	Energy Management (offered in the second year)	(9)	(15)	
EVW129N	Environmental and Waste Management (offered in the second year)	(9)	(15)	
LCN129N	Life Cycle Management	(9)	(15)	
OPR129N	Operational Research	(9)	(15)	
ORB129N	Organisational Behaviour (offered in the second year)	(9)	(15)	
PAM129N	Physical Asset Management (offered in the second year)	(9)	(15)	
QEN129N	Quality Engineering	(9)	(15)	
TPM129N	Transportation Management (offered in the second year)	(9)	(15)	

SECOND YEAR
Modules are offered as determined by the Head of the Department.

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EFI129N	Engineering Finance	(9)	(15)	
RP129BN	Research Project Part B*	(9)	(15)*	Research Project Part A
RP129CN	Research Project Part C*	(9)	(15)*	Research Project Part B
TVC129N	Technology Venture Creation	(9)	(15)	

plus four of the following electives (if not previously taken):

AMS129N	Advanced Manufacturing Systems (offered in the first year)	(9)	(15)
CUS129N	Construction Management	(9)	(15)
EGM129N	Energy Management	(9)	(15)
EVW129N	Environmental and Waste Management	(9)	(15)
LCN129N	Life Cycle Management (offered in the first year)	(9)	(15)
OPR129N	Operational Research (offered in the first year)	(9)	(15)
ORB129N	Organisational Behaviour	(9)	(15)
PAM129N	Physical Asset Management	(9)	(15)
QEN129N	Quality Engineering (offered in the first year)	(9)	(15)
TPM129N	Transportation Management	(9)	(15)

TOTAL CREDITS FOR THE QUALIFICATION: **180**

7.6 DOCTOR OF ENGINEERING

DEng - NQF Level 10 (360 credits)

Qualification code: DENG17

(Specialisation codes for admission and registration: DEIN17 / DESY17)

SAQA ID: 96873, CHE NUMBER: H16/10751/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Magister Technologiae: Engineering, **or** a Master of Engineering, **or** a master's degree at NQF Level 9 in a related field, obtained from a South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
All applications are subject to selection. Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Candidates should submit a copy of at least one scholarly article published or accepted for publication (with proof of acceptance) in a DHET accredited or peer-reviewed journal, and a copy of one scholarly article that has already been submitted for publication in a DHET accredited or peer-reviewed journal (with proof of receipt by the journal). Special cases will be treated on merit by the Faculty Committee for Postgraduate Studies. Candidates who meet the minimum academic requirements might be invited for a personal interview with a Departmental Selection Panel.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status:
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January and July.

e. *Presentation:*
Research.

f. *Duration:*
A minimum of two years and a maximum of five years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Rules on postgraduate studies:*
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

The modules offered within the Doctor of Engineering differ between departments. Please refer to the contents (page 5) to see which of the other departments within the faculty offer this programme.

Students register for one of the following specialisation codes:

CODE	MODULE	NQF-L	CREDIT
Industrial Engineering (DEIN17)			
IE1010O	Thesis: Engineering: Industrial	(10)	(360)
IE1010R	Thesis: Engineering: Industrial (re-registration)	(10)	(0)
IE1110R	Thesis: Engineering: Industrial (re-registration) (semester option)	(10)	(0)
Systems Engineering (DESY17) **(this option is not currently offered)**			
SE1010O	Thesis: Engineering: Systems	(10)	(360)
SE1010R	Thesis: Engineering: Systems (re-registration)	(10)	(0)
SE1110R	Thesis: Engineering: Systems (re-registration) (semester option)	(10)	(0)
TOTAL CREDITS FOR THE QUALIFICATION:			**360**

8. DEPARTMENT OF MECHANICAL AND MECHATRONICS ENGINEERING

8.1 HIGHER CERTIFICATE IN MECHANICAL ENGINEERING

HCert (Mechanical Engineering) - NQF Level 5 (140 credits)

Qualification code: HCME18

SAQA ID: 99534, CHE NUMBER: H/H16/E025CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

  Admission requirement(s):
  A Senior Certificate or an equivalent qualification, with C symbols at Standard or D symbols at Higher Grade for English and Mathematics, and a D symbol at Standard Grade or an E symbol at Higher Grade for Physical Science.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a higher certificate endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and Mathematics or Technical Mathematics, and at least a 3 for Physical Sciences or Technical Sciences.

  Applicants who do not meet the requirements for Mathematics, Physical Sciences, or any of the two additional subjects may enroll for these subjects at any Technical and Vocational Education and Training (TVET) College (see National N Certificate requirements), and if these are successfully passed at a performance level of at least 50%, they may re-apply for admission to the University.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

  Recommended subject(s):
  Mechanical Technology or Technical: Mechanical Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a higher certificate endorsement, with at least 50% (APS of 4) for English (first additional language) and Mathematics, and 50% for Life Orientation (excluded for APS calculation) and 40% (APS of 3) for Science, and any other three compulsory vocational subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

Recommended subject(s):
None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH AN N4 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N4:**

  Admission requirement(s):
  An N4 Certificate in a related Engineering field as published in Report 191: N4, with at least an average of 50% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

b. *Assessment procedure(s):*
No further assessment will be done (except for candidates with an N4 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Day classes. Classes and assessments may take place on Friday afternoons and/or Saturdays.

f. *Minimum duration:*
One year.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

ATTENDANCE

CODE	MODULE	NQF-L	CREDIT
CML105X	Computer Literacy	(5)	(10)
COM105X	Communication Skills	(5)	(8)
EPH105C	Engineering Physics	(5)	(14)
INL125C	Information Literacy (block module)	(5)	(1)
LFS125X	Life Skills (block module)	(5)	(2)
TMA105C	Technical Mathematics	(5)	(21)
FIRST SEMESTER			
EEN115C	Electrical Technology	(5)	(14)
EGR115C	Engineering Graphics	(5)	(14)
WOP115C	Workshop Practice	(5)	(14)
SECOND SEMESTER			
MCH115C	Mechatronics	(5)	(14)
MEC115C	Mechanics	(5)	(14)
MTO115C	Manufacturing and Tooling	(5)	(14)
TOTAL CREDITS FOR THE QUALIFICATION:			**140**

8.2 BACHELOR OF ENGINEERING TECHNOLOGY IN MECHANICAL ENGINEERING

BEngTech (Mechanical Engineering) - NQF Level 7 (420 credits)

Qualification code: BPME18

SAQA ID: 99638, CHE NUMBER: H/H16/E024CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

Admission requirement(s):
A Senior Certificate with a matriculation endorsement or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, and B symbols at Standard Grade or C symbols at Higher Grade for Mathematics and Physical Science.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

Recommended subject(s):
None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and 5 for Mathematics or Technical Mathematics, and 5 for Physical Sciences or Technical Sciences.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subjects:
  Engineering Graphics and Design and Mechanical Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics and Science, and 60% (APS of 5) for any other three compulsory vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

  Admission requirement(s):
  An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

  The applicant will be considered for admission to the programme, if any of the following qualifications has been completed:

  - Higher Certificate in Mechanical Engineering (NQF Level 5 - 140 credits): an average of at least 60% for the qualification, and 60% in each of the following modules: Engineering Graphics, Engineering Physics, Mechanics and Technical Mathematics.
  - Advanced Certificate in Mechanical Engineering (NQF Level 6 - 140 credits): an average of at least 60% for the qualification.
  - Diploma in Mechanical Engineering Technology (NQF Level 6 - 280 credits): an average of at least 55% for the qualification.
  - National Diploma: Engineering: Mechanical (NQF Level 6 - 3,000 credits): an average of at least 55% for the qualification.

b. *Assessment procedure(s):*
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

Applicants who do not meet the minimum requirements, might be transferred to the Higher Certificate in Mechanical Engineering, provided that he/she meets the minimum requirements.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Day classes.

f. *Minimum duration:*
Three years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

Key to asterisks:

* Information does not correspond to SAQA registration certificate as per SAQA ID: 99638. (The deviations were approved by the Senate meeting of September 2023.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
COL105X	Computer Literacy	(5)	(5)	
COS105X	Communication Skills	(5)	(6)	
EGE105B	Engineering Graphics	(5)	(14)	
ELC105B	Electrical Circuits	(5)	(28)	
INL125C	Information Literacy (block module)	(5)	(1)	

LFS125X	Life Skills (block module)	(5)	(2)	
MEC105B	Mechanics	(5)	(28)	

FIRST SEMESTER

EM115AB	Engineering Mathematics IA*	(5)	(14)*	
MAN115B	Manufacturing I	(5)	(14)	

SECOND SEMESTER

EM115BB	Engineering Mathematics IB*	(5)	(14)*	Engineering Mathematics IA
SOM115B	Strength of Materials I	(5)	(14)	

TOTAL CREDITS FOR THE FIRST YEAR: **140**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
DOM206B	Design of Machines	(6)	(28)	Engineering Mathematics IA Engineering Mathematics IB Mechanics
EMA206B	Engineering Mathematics II	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
EMT206B	Engineering Materials	(6)	(14)	Manufacturing I
FLM207B	Fluid Mechanics	(7)	(28)	Engineering Mathematics IA Engineering Mathematics IB Mechanics
PAS206B	Probability and Statistics	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
THE207B	Thermodynamics	(7)	(28)	Engineering Mathematics IA Engineering Mathematics IB

FIRST SEMESTER

SCP216B	Scientific Computing	(6)	(14)	

TOTAL CREDITS FOR THE SECOND YEAR: **140**

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
MEP307B	Mechanical Design Projects	(7)	(28)	Design of Machines Engineering Materials Engineering Mathematics II Probability and Statistics Scientific Computing
SOM307B	Strength of Materials II	(7)	(28)	Strength of Materials I

FIRST SEMESTER

CMH316B	Control of Machines	(6)	(14)	Engineering Mathematics II
EPE316B	Electrical Power Engineering	(6)	(14)	Electrical Circuits
MAN317B	Manufacturing II	(7)	(14)	Engineering Materials Engineering Mathematics IA Engineering Mathematics IB Manufacturing I

SECOND SEMESTER

DYN317B	Dynamics	(7)	(14)	Engineering Mathematics IA Engineering Mathematics IB Mechanics
EPR317B	Engineering Practice	(7)	(14)	
HTR317B	Heat Transfer	(7)	(14)	Engineering Mathematics II Fluid Mechanics Thermodynamics

TOTAL CREDITS FOR THE THIRD YEAR: **140**

TOTAL CREDITS FOR THE QUALIFICATION: **420**

8.3 BACHELOR OF ENGINEERING TECHNOLOGY HONOURS IN MECHANICAL ENGINEERING

BEngTechHons (Mechanical Engineering) - NQF Level 8 (140 credits)
Qualification code: BHME21
SAQA ID: 117965, CHE NUMBER: H/H16/E199CAN

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
A Bachelor of Engineering in Mechanical Engineering, **or** a Bachelor of Engineering Technology in Mechanical Engineering, **or** a Baccalaureus Technologiae: Mechanical, **or** an Advanced Diploma in Mechanical Engineering, **or** an equivalent qualification with an aggregate of 60% for the final year of study, **or** an NQF Level 7 qualification in a closely related field, obtained from an accredited South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
Admission is subject to selection. Prospective students will be evaluated based on the marks obtained in the previous qualification and/or work experience.

All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Block-mode classes offered over a period of one year (full time as from 2026) or two years (part-time).

f. Minimum duration:
A minimum of one or two years (depending on the programme presentation).

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may re-register for the module Research Project: Mechanical Engineering only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the final project only, and not to redo the whole module, should they fail the module.

CURRICULUM

Full-time students should register for all modules in one academic year.

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
FIRST SEMESTER			
DAN118S	Data Analysis	(8)	(10)
RME118S	Research Methodology	(8)	(10)
SYD118S	System Dynamics	(8)	(15)
SECOND SEMESTER			
OTY118S	Optimisation Theory	(8)	(15)
SMG118S	Sustainable Management	(8)	(10)
THT118S	Thermal Energy Systems (only for students who will be choosing the Thermal Energy option)	(8)	(15)
TOTAL CREDITS FOR THE FIRST YEAR:			**75**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
RMH108S	Research Project: Mechanical Engineering	(8)	(30)
RMH118R	Research Project: Mechanical Engineering (re-registration) (first-semester module, see paragraph h)	(8)	(0)
SECOND SEMESTER			
All modules from one of the following options:			
Materials Manufacturing			
FEM118S	Finite Element Modelling (first-semester module)	(8)	(15)
MPT118S	Materials Processes and Technology (first-semester module)	(8)	(15)
MPU118S	Materials Properties and Manufacturing	(8)	(15)
Physical Asset Management			
ASM118S	Asset Management	(8)	(15)

FEM118S	Finite Element Modelling (first-semester module)	(8)	(15)
MHM118S	Mechanical Maintenance Engineering (first-semester module)	(8)	(15)

Thermal Energy

PWP118S	Power Plant (first-semester module)	(8)	(15)
RRC118S	Refrigeration and Air Conditioning	(8)	(15)
THT118S	Thermal Energy Systems (if not already completed in the first year)	(8)	(15)

plus one of the following electives (only CTS116S, EPY116S and ETN116S will be offered until further notice):

CTS116S	Contracts	(6)	(5)
EGU116S	Engineering Education	(6)	(5)
EPY116S	Energy Economics and Policy	(6)	(5)
ETN116S	Entrepreneurship	(6)	(5)
IBO116S	International Business Communication	(6)	(5)
IND116S	Industrial Design	(6)	(5)
ITR116S	Intellectual Property	(6)	(5)

TOTAL CREDITS FOR THE SECOND YEAR: **65**

TOTAL CREDITS FOR THE QUALIFICATION: **140**

8.4 BACHELOR OF ENGINEERING TECHNOLOGY IN MECHATRONIC ENGINEERING

BEngTech (Mechatronic Engineering) - NQF Level 7 (420 credits)

Qualification code: BPMR18

SAQA ID: 99604, CHE NUMBER: H/H16/E023CAN

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

Admission requirement(s):
A Senior Certificate with a matriculation endorsement or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, and B symbols at Standard Grade or C symbols at Higher Grade for Mathematics and Physical Science.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

Recommended subject(s):
None.

- **FOR APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

  Admission requirement(s):
  A National Senior Certificate or an equivalent qualification, with a bachelor's degree endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and 5 for Mathematics or Technical Mathematics, and 5 for Physical Sciences or Technical Sciences.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subjects:
  Engineering Graphics and Design and Mechanical Technology.

- **FOR APPLICANTS WITH A NATIONAL CERTIFICATE (VOCATIONAL) AT NQF LEVEL 4:**

  Admission requirement(s):
  A National Certificate (Vocational) at NQF Level 4, with a bachelor's degree endorsement, with at least a 50% (APS of 4) for English (first additional language), 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics and Science, and 60% (APS of 5) for any other three compulsory vocational subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

  Admission requirement(s):
  A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

  Selection criteria:
  To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH AN N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

  Admission requirement(s):
  An N6 Certificate in a related Engineering field as published in Report 191: N6, with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

  Recommended subject(s):
  None.

- **FOR APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

  The applicant will be considered for admission to the programme, if any of the following qualifications has been completed:

  - Higher Certificate in Mechanical Engineering (NQF Level 5 - 140 credits): with an average of at least 60% for the qualification, and 60% in each of the following modules: Engineering Graphics, Engineering Physics, Mechatronics and Technical Mathematics.
  - Advanced Certificate in Mechanical Engineering (NQF Level 6 - 140 credits): with an average of at least 60% for the qualification.
  - National Diploma: Engineering: Mechanical (NQF Level 6 - 3,000 credits): with an average of at least 55% for the qualification.
  - National Diploma: Mechatronics (NQF Level 6 - 3,000 credits): with an average of at least 55% for the qualification.

b. *Assessment procedure(s):*
No further assessment will be done (except for candidates with an N6 Certificate (see above)). Applicants who achieve the minimum APS will be considered until the programme complement is full. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) and preference would be given to first-time entering students. Once a programme is full, a waiting list will be in created to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

Applicants who do not meet the minimum requirements, might be transferred to the Higher Certificate in Mechanical Engineering, provided that he/she meets the minimum requirements.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January only.

e. *Presentation:*
Day classes.

f. *Minimum duration:*
Three years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

Key to asterisks:

* Information does not correspond to SAQA registration certificate as per SAQA ID: 99604. (The deviations were approved by the Senate meeting of September 2023 and November 2023.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
COL105X	Computer Literacy	(5)	(5)	
COS105X	Communication Skills	(5)	(6)	
EGE105B	Engineering Graphics	(5)	(14)	
ELC105B	Electrical Circuits	(5)	(28)	
ELS105B	Electronic Circuits	(5)	(28)	

INL125C	Information Literacy (block module)	(5)	(1)	
LFS125X	Life Skills (block module)	(5)	(2)	
MEC105B	Mechanics	(5)	(28)	

FIRST SEMESTER

EM115AB	Engineering Mathematics IA*	(5)	(14)*	

SECOND SEMESTER

EM115BB	Engineering Mathematics IB*	(5)	(14)*	Engineering Mathematics IA

TOTAL CREDITS FOR THE FIRST YEAR: **140**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EMA206B	Engineering Mathematics II	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB
PAS206B	Probability and Statistics	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB

FIRST SEMESTER

EB216AB	Embedded Systems A*	(6)	(14)*	Electronic Circuits
ES216AB	Engineering Software Design A*	(6)	(14)*	Computer Literacy
DOM216B	Design of Machines	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB Mechanics
SOM216B	Strength of Materials	(6)	(14)	Engineering Mathematics IA Engineering Mathematics IB Mechanics

SECOND SEMESTER

EB216BB	Embedded Systems B*	(6)	(14)*	Embedded Systems A Engineering Software Design A
ES216BB	Engineering Software Design B*	(6)	(14)*	Engineering Software Design A
LSM216B	Linear System Modelling	(6)	(14)	Electrical Circuits Engineering Mathematics IA Engineering Mathematics IB Mechanics
MDR216B	Machines and Drives	(6)	(14)	Electrical Circuits Engineering Mathematics IA Engineering Mathematics IB Mechanics

TOTAL CREDITS FOR THE SECOND YEAR: **140**

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
CNS307B	Control Systems	(7)	(28)	Engineering Mathematics II
MED307B	Mechatronics Design Projects	(7)	(28)	Design of Machines Engineering Mathematics II

PAU307B	Process Automation	(7)	(28)	Design of Machines Electrical Circuits Machines and Drives
TMF307B	Thermoflow	(7)	(28)	Engineering Mathematics IA Engineering Mathematics IB Mechanics

FIRST SEMESTER

IDC317B	Industrial Data Communication	(7)	(14)	Electrical Circuits Electronic Circuits

SECOND SEMESTER

ENP317B	Engineering Practice	(7)	(14)	

TOTAL CREDITS FOR THE THIRD YEAR: **140**

TOTAL CREDITS FOR THE QUALIFICATION: **420**

8.5 BACHELOR OF ENGINEERING TECHNOLOGY HONOURS IN MECHATRONIC ENGINEERING

BEngTechHons (Mechatronic Engineering) - NQF Level 8 (140 credits)
Qualification code: BHMR24
SAQA ID: 117967, CHE NUMBER: H/H16/E198CAN

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
A Bachelor of Engineering in Mechatronic Engineering, **or** a Bachelor of Engineering Technology in Mechatronic Engineering, **or** a Baccalaureus Technologiae: Engineering: Mechanical (Mechatronics), **or** an Advanced Diploma in Mechatronic Engineering, **or** an equivalent qualification with an aggregate of 60% for the final year of study, or an NQF Level 7 qualification in a closely related field, obtained from an accredited South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. *Selection criteria:*
Admission is subject to selection. Prospective students will be evaluated based on the marks obtained in the previous qualification and/or work experience.

All completed applications received within the published due dates will be ranked. After consideration of the Student Enrolment Plan (SEP), only the top-ranked applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill the places of those who did not register on time. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January only.

e. Presentation:
Block-mode classes offered over a period of two years.

f. Minimum duration:
A minimum of one or two years (depending on the programme offering).

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Re-registration:
A student may re-register for the module Research Project: Mechatronics Engineering only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the project only, and not to redo it, should they fail the module.

CURRICULUM

Key to asterisks:
* Information does not correspond to SAQA registration certificate as per SAQA ID: 117967. (The deviations are pending final approval by SAQA.)

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
FIRST SEMESTER			
DAN118S	Data Analysis	(8)	(10)
RES118S	Research Methodology	(8)	(10)
SECOND SEMESTER			
OTY118S	Optimisation Theory	(8)	(15)
SMG118S	Sustainable Management	(8)	(10)
TOTAL CREDITS FOR THE FIRST YEAR:			**45**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
RPM108S	Research Project: Mechatronics Engineering	(8)	(30)
RPM118R	Research Project: Mechatronics Engineering (re-registration) (first-semester module, see paragraph h)	(8)	(0)
FIRST SEMESTER			
DGN118S	Digital Enterprise	(8)	(20)*
MIL118S	Modern and Industrial Control	(8)	(20)*
SECOND SEMESTER			
IRO118S	Introduction to Robotics	(8)	(20)*

plus one of the following electives (only CTS116S, EPY116S and ETN116S will be offered until further notice):

CTS116S	Contracts	(6)	(5)
EGU116S	Engineering Education	(6)	(5)
EPY116S	Energy Economics and Policy	(6)	(5)
ETN116S	Entrepreneurship	(6)	(5)
IBO116S	International Business Communication	(6)	(5)
IND116S	Industrial Design	(6)	(5)
ITR116S	Intellectual Property	(6)	(5)

TOTAL CREDITS FOR THE SECOND YEAR: **95**

TOTAL CREDITS FOR THE QUALIFICATION: **140**

8.6 MASTER OF ENGINEERING IN MECHANICAL ENGINEERING

MEng (Mechanical Engineering) - NQF Level 9 (180 credits)

Qualification code: MEME17

SAQA ID: 96900, CHE NUMBER: H16/2256/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Mechanical **or** a Bachelor of Engineering in Mechanical Engineering, **or** a Bachelor of Science in Mechanical Engineering, **or** a Bachelor of Engineering Technology Honours in Mechanical Engineering, **or** an NQF Level 8 qualification in Mechanical Engineering (or a related field), obtained from a South African university, with an aggregate of 60% for the final year of study.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

Candidates with a baccalaureus technologiae, will be required to complete bridging modules at NQF Level 8 before registration (through an online mode: BPENO4). The modules are: Data Analysis (DAN118N), Research Methodology (RES118N or RME118N) and System Dynamics (SYD118N) (or their equivalents). Full-time candidates may apply to complete these bridging modules concurrently with the registered master's degree on approval from the Head of the Department.

b. *Selection criteria:*
Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Applicants who do not meet the 60% minimum academic requirement, might be invited for a selection interview with a Departmental Selection Committee.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. Intake for the qualification:
January and July.

e. Presentation:
Research.

f. Duration:
A minimum of one year and a maximum of three years.

g. Exclusion and readmission:
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. Rules on postgraduate studies:
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

CODE	MODULE	NQF-L	CREDIT
MCC109M	Dissertation: Engineering: Mechanical	(9)	(180)
MCC109R	Dissertation: Engineering: Mechanical (re-registration)	(9)	(0)
MCC119R	Dissertation: Engineering: Mechanical (re-registration) (semester option)	(9)	(0)
TOTAL CREDITS FOR THE QUALIFICATION:			**180**

8.7 DOCTOR OF ENGINEERING

DEng - NQF Level 10 (360 credits)

Qualification code: DENG17

(Specialisation codes for admission and registration: DEME17 / DEMF17)

SAQA ID: 96873, CHE NUMBER: H16/10751/HEQSF

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s):
A Magister Technologiae: Engineering, **or** a Master of Engineering, **or** a master's degree at NQF Level 9 in a related field, obtained from a South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations (Part 1 of the Prospectus).

b. Selection criteria:
All applications are subject to selection. Admission will be subject to approval of a project proposal by the Departmental Research Committee (DRC). Candidates should submit a copy of at least one scholarly article published or accepted for publication (with proof of acceptance) in a DHET accredited or peer-reviewed journal, and a copy of one scholarly article that has already been submitted for publication in a DHET accredited or peer-reviewed journal (with proof of receipt by the journal). Special cases will be treated on merit by the Faculty Committee for Postgraduate Studies. Candidates who meet the minimum academic requirements might be invited for a personal interview with a Departmental Selection Panel.

Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per an official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*
Information on the rules and the process to follow is available in Chapter 30 of Students' Rules and Regulations (Part 1 of the Prospectus).

d. *Intake for the qualification:*
January and July.

e. *Presentation:*
Research.

f. *Duration:*
A minimum of two years and a maximum of five years.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations (Part 1 of the Prospectus).

h. *Rules on postgraduate studies:*
See Chapter 8 of Students' Rules and Regulations (Part 1 of the Prospectus).

CURRICULUM

The modules offered within the Doctor of Engineering differ between departments. Please refer to the contents (page 5) to see which of the other departments within the faculty offer this programme.

Students register for one of the following specialisation codes:

CODE	MODULE	NQF-L	CREDIT
Mechanical Engineering (DEME17)			
ME1010O	Thesis: Engineering: Mechanical	(10)	(360)
ME1010R	Thesis: Engineering: Mechanical (re-registration)	(10)	(0)
ME1110R	Thesis: Engineering: Mechanical (re-registration) (semester option)	(10)	(0)
Manufacturing Engineering (DEMF17)			
MN1010O	Thesis: Engineering: Manufacturing	(10)	(360)
MN1010R	Thesis: Engineering: Manufacturing (re-registration)	(10)	(0)
MN1110R	Thesis: Engineering: Manufacturing (re-registration) (semester option)	(10)	(0)
TOTAL CREDITS FOR THE QUALIFICATION:			**360**

SECTION B: PHASING OUT QUALIFICATIONS

No new registrations for qualifications within this section will be accepted. Students registered for any of these qualifications should complete their studies according to the teach-out date prescribed for the qualification, subject to the stipulations of Regulation 3.1.11 and 3.1.13 in the Students' Rules and Regulations.

Information on phased-out programmes can be obtained from the TUT website, www.tut.ac.za.

1. DEPARTMENT OF BUILDING SCIENCES

1.1 DIPLOMA IN BUILDING

Dip (Building) - NQF Level 6 (360 credits)

Qualification code: DBSC17 - NQF Level 6

SAQA ID: 96922, CHE NUMBER: H16/10744/HEQSF

Campus where offered:	Pretoria Campus (day classes)
Last year of new intake:	January 2024
Teach-out (phase-out) date:	31 December 2028
Curriculum:	2023 Prospectus

2. DEPARTMENT OF INDUSTRIAL ENGINEERING

2.1 MASTER OF ENGINEERING IN ENGINEERING MANAGEMENT

MEng (Engineering Management) - NQF Level 9 (180 credits)

Qualification type: Structured Master's Degree

Qualification code: MEEM18

SAQA ID: 96899, CHE NUMBER: H16/10747/HEQSF

Campus where offered:	Pretoria Campus (Research and block-mode classes)
Last year of new intake:	July 2024
Teach-out (phase-out) date:	31 December 2027
Curriculum:	2024 Prospectus

SECTION C: MODULE INFORMATION (OVERVIEW OF SYLLABUS)

The syllabus content is subject to change to accommodate industry changes. Please note that a more detailed syllabus is available at the relevant academic department or in the study guide that applies to a particular module. At the time of publication, the syllabus content was defined as follows:

A

ADJUSTMENT COMPUTATIONS AND STATISTICAL ANALYSIS (CSL206B) — **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Introduction to Adjustment Computations, Statistical Analysis, Random Error theory and probability. Confidence Intervals. Statistical Testing. Regression. Analysis and Correlation. Matrix Algebra. Propagation of random Errors in indirectly measured quantities. Error Propagation in angle and distance measurements. Traverse Surveys. Elevation Determination. Weights of Observations. Principles of Least Squares. Network Adjustment. Coordinate Transformations. Analysis of Adjustment. (Total notional time: 240 hours)

ADJUSTMENT OF ERRORS AND STATISTICS (EST206D) — **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Introduction to Error Concept and Error Adjustment; Basic Statistical Concepts for Adjustment of Errors; Random Error theory and probability; Confidence Intervals; Hypothesis Testing; Regression Analysis and Correlation; Matrix Algebra; Error Propagation; Weights of Observations; Principles of Least Squares; Network Adjustment. (Total notional time: 240 hours)

ADVANCED BUILDING PHYSICS AND SYSTEMS DESIGN IV (ABP418P) — **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Expert study of advanced building physics and systems design, focusing on: (1) Hygrothermal movement in built structures. (2) Building acoustics. (3) Light properties of buildings. (4) Buildings components. (5) Simulation tools. (6) Optimisation algorithms; and (7) Efficient energy management of buildings and neighbourhoods. (Total notional time: 120 hours)

ADVANCED COMPUTER APPLICATIONS V (ARA109M) — **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Visual communication and presentation software, website design and maintenance. (Total notional time: 40 hours)

ADVANCED CONSTRUCTION IV (ACC418P) — **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Expert study of advanced construction technologies, focusing on: (1) 3D printing. (2) Computer-aided design and computer-aided manufacturing (CAD/CAM). (3) Modular construction. (4) Off-site manufacturing. (5) Prefabrication and pre-assembly; and (6) Smart technologies. (Total notional time: 120 hours)

ADVANCED CONSTRUCTION ECONOMICS (CEC108G) — **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Sciences)

The research and application of advanced concepts of construction economics, strategic planning, financing and developing of property investments internationally. The computing of financial feasibility studies. Comparing with alternative sustainability property developments, including value- and risk management, as well as whole life appraisals. The objectives are that students must be able to demonstrate understanding and to advise developers and property investors, on completion of this module and compile a project cost information system. (Total notional time: 240 hours)

ADVANCED CONSTRUCTION MANAGEMENT (CUM107V) — **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Sciences)

Introduction to construction project management; Financial planning and control; Planning techniques; Personnel and conflict management; Communication management; Risk management; Quality management; Procurement management; Contract strategies and management; and Construction productivity. (Total notional time: 240 hours)

ADVANCED CONVERSION SYSTEMS (ACS307B) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Electrical Engineering)
Single-Phase Induction Motors. Three-Phase Induction Machines. Three-Phase Synchronous Machines. Power Electronic Components. Introduction to Power Electronics Converters. (Total notional time: 280 hours)

ADVANCED DESCRIPTIVE QUANTIFICATION (DQU107V) **1 X 4-HOUR PAPER (OPEN BOOK)**
(Module custodian: Department of Building Sciences)
A comprehensive study of the measurement of more specialised elements of builder's work, including basements, underpinning, ground anchors, planking and strutting, shoring, composite/coffered and troughed reinforced concrete slabs, retaining walls, precast concrete, external works, etc. Measurement of Electrical and Mechanical installations. Measurement of Civil Engineering work including site investigations and clearing, earthworks, dredging, concrete work, brickwork, piling, steelwork, roads and paving, pipelines and railway lines and sidings. Computer measurement in Win QS, QS Plus and CCS. Undertake advanced descriptive quantification and manage price determination processes for Built Environment Projects. (Total notional time: 240 hours)

ADVANCED EMBEDDED SYSTEMS (AES317B) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Electrical Engineering)
8-bit AVR Microcontroller and High-level Programming; Serial Interface Electrical Standards (RS232, RS422 and RS485); Digital Serial Communications Protocols (FIELDBUS, Ethernet and USB); Synchronous Serial Communication Protocols (SPI and I2C); RF Modules Attached to USART (Bluetooth and Others); External Peripherals (RTCC, EEPROM, FRAM and DMA Controller). (Total notional time: 140 hours)

ADVANCED MANUFACTURING (AMF118S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
Reconfigurable manufacturing systems; Robotics systems in manufacturing; Autonomous systems; Control systems applications in manufacturing; Computer integrated manufacturing; and South African advanced manufacturing landscape. (Total notional time: 150 hours)

ADVANCED MANUFACTURING (AMF317B) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
General manufacturing knowledge, as well as cognitive and conceptual tools, other modules in the qualification and the workplace. The relationship between scientific theory and real life is emphasised. (Total notional time: 140 hours)

ADVANCED MANUFACTURING SYSTEMS (AMS129N) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
Reconfigurable Manufacturing Systems, Robotics Systems, Autonomous Systems, Control Systems, Computer Integrated Manufacturing. (Total notional time: 150 hours)

ADVANCED OPERATIONAL RESEARCH (AOT118S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
Introduction to model building; Basic linear algebra; Linear programming; Sensitivity analysis; Goal programming and nonlinear programming; Transportation, assignment, and transhipment problems; Markov chains; and Decision support systems and multi-criteria decision models. (Total notional time: 150 hours)

ADVANCED PRECISE ENGINEERING SURVEYING I (PC1118G) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
This module provides students with the application of the knowledge, cognitive and conceptual tools and practical skills in surveying to manipulate data collected. The key is to provide the student with an advanced understanding of Precise Engineering Surveying. The surveyor will often be required to use their judgment to make important decisions affecting the survey. Specifically, this module will include aerial photography and photogrammetry for precise specifications, specialised instrumentation for advanced precise surveys, precise engineering surveying and heighting methods and precise deformation surveys and monitoring. (Total notional time: 120 hours)

ADVANCED PRECISE ENGINEERING SURVEYING II (PC2118G) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
This module provides students with the application of the knowledge, cognitive and conceptual tools and practical skills in surveying to manipulate data collected. specifically, this unit will include the design of monitoring projects, precise techniques for setting out structures, geodetic control network surveys, horizontal positioning techniques, and geodetic vertical positioning techniques. lastly, case studies of highly precise surveys are included. (Total notional time: 120 hours)

ADVANCED PROFESSIONAL PRACTICE IV (APC418P) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Expert study of Architectural Project management, focusing on: (1) Project management tools and techniques; (2) Project management methodologies. (3) Project success through the application of project management methods. (4) Planning tools supporting design project management, and (5) Specifications. Intermediate study of Quantity Surveying, focusing on: (1) The methodology of measuring. (2) Building cost estimates. (3) Feasibility studies. (4) Economic design. (5) Contract administration; and (6) Valuation of buildings. (Total notional time: 120 hours)

ADVANCED SATELLITE SURVEYING AND GEODESY (ASG118G) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
The purpose of the module is to provide students with a deeper understanding of satellite surveying and geodesy as it relates to geomatics and geomatics practice. Students will be equipped with the skills to apply trigonometric computations on spherical and spheroidal earth models, the skills to convert point coordinates between different geodetic datums and be able to analyse how irregular shapes of Earth models and the gravity field can affect the accuracy of geodetic measurements. (Total notional time: 120 hours)

ADVANCED THEORY OF SURVEY ADJUSTMENTS (ATS118G) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
This module equips students with advanced skills for determining errors in surveying and then applying adjustments to observations so that the computed values of indirect measurements can be as accurate as possible. The module includes units in advanced error propagation, least squares adjustments, error ellipses, coordinate transformations, GNSS networks, 3D-geodetic network adjustments and analyses of adjustments. (Total notional time: 120 hours)

APPLIED BUILDING SCIENCE I (ABC105D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Physics)
Basic mathematics. Basic algebra, geometry, mensuration, trigonometry, calculus. Basic applied mechanics as applied to concrete, steel and timber constructions in the building industry. Expansion and contraction. Convection, conduction and radiation of heat in buildings. Heat energy and units of measurement. Thermal conductivity and resistance. Sound: sound propagation and units of measurement, sound insulation, sound reflection, reverberation and acoustics. Reticulation and electricity consumption. Definition of basic electricity terms. Direct and indirect current. Serial and parallel circuits. Three-phase supply lines and power consumption of household appliances, pumps and lifts. Lighting in buildings: light propagation, photometry, basic units of measurement in lighting, artificial light. Basic concepts of hydrology. Pressure in liquids. Hydraulic jacks. The flow of liquid through pipes. Different types of pumps. Basic probability and statistics. (Total notional time: 200 hours)

APPLIED PHOTOGRAMMETRY (APG206D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Geomatics)
The module covered in this module comprises of learning to understand and appreciate some fundamental and advanced concepts of digital Photogrammetry necessary for a study in Geomatics. Students will be exposed to theory, projects and practical assignments specially aligned to further strengthen their understanding of the concepts introduced. The module will further require that students integrate knowledge, theory and practical skills in other modules offered through the first-year level of the Geomatics qualification. (Total notional time: 240 hours)

ARCHITECTURAL DESIGN I (ACD105P, ACD005P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Fundamental Architectural Design processes and concepts, focusing on: (1) Small-scale design problems. (2) Design methods, principles, skills and techniques. (3) Primary elements in architecture. (4) Spatial composition and spatial relationships. (5) Shelter and habitation. (6) Anthropometry and ergonomics. (7) Design presentation using drawings and models. (8) Determining visual literacies and developing architectural vocabulary and design communication. (9) Product design and manufacturing, and (10) Independent thinking and decision-making. (Total notional time: 480 hours for ACD105P and 240 hours for ACD005P)

ARCHITECTURAL DESIGN II (ACD216P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Intermediate Architectural Design processes and concepts, focusing on: (1) Design problems ranging from the small group to a broader urban environment. (2) Spatial design and form-making in response to precedent, tectonic and contextual influences. (3) Social and spatial densities. (4) Programmatic and organisational strategies in the design process. (5) Product design and manufacturing; and (6) Independent thinking and decision-making. (Total notional time: 480 hours)

ARCHITECTURAL DESIGN III (ACD307P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Advanced Architectural Design processes and concepts, focusing on:
(1) Design projects negotiating the complex issues of program, macro-climate, micro-climate, site, structure, technology, form and construction. (2) Specific cultural contexts which produce appropriate architecture. (3) Landscape design. (4) Urban networks and ecology. (5) Design competitions. (6) Product design and manufacturing; and (7) Independent thinking and decision-making. (Total notional time: 540 hours)

ARCHITECTURAL DESIGN IV (ACD408P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Expert Architectural Design processes and concepts, focusing on: (1) Complex design projects in the urban realm. (2) The relationship between the urban fabric and a design solution. (3) Elements of cities and urban environments. (4) The interpretation of local heritage, urban conditions, climatic influences and social structures in design proposals. (5) Speculative design and lateral thinking. (6) Design competitions. (7) Product design and manufacturing; and (8) Independent thinking and decision-making. (Total notional time: 540 hours)

ARCHITECTURAL DESIGN V (ACH109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Design exercises with a quarterly focus on academic origin and teamwork, urban renewal and the multi-storey building, humble things and a mini-dissertation. (Total notional time: 270 hours)

ARCHITECTURAL PRACTICE V (AHC109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

The services and duties of the professional practitioner of architecture as defined by the Architectural Profession Act, 2000 (Act No. 44 of 2000) and the SACAP Board Notice 154 of 2009 (the Code of Professional Conduct). Specific themes include time as a resource, managing projects and clients, as well as post-completion responsibilities. (Total notional time: 70 hours)

ASSET MANAGEMENT (ASM118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

The fundamentals of asset management; Introduction to asset life-cycle management; Engineering design decisions; Quantitative and qualitative methods supporting life cycle assessment; Life cycle assessment models; Understanding ISO 55001 and ISO 14040 standards; and Life cycle costing. (Total notional time: 150 hours)

AUTOMATION (AUT216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Flow-sheet symbols and functional diagramming for process instrumentation diagrams. Measurements; Manipulation; Hierarchical control; Programmable logic controllers (PLC); Distributed control systems (DCS); Supervisory control and data acquisition (SCADA); an introduction to networks in process automation. (Total notional time: 140 hours)

AUTOMATION (AUT216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Flow sheet symbols and functional diagramming for process instrumentation diagrams; Measurement; Manipulation; Hierarchical control; Programmable logic controllers (PLC); Distributed control systems (DCS); Supervisory control and data acquisition (SCADA); and introduction to networks in process automation. (Total notional time: 120 hours)

AUTOTRONIC TECHNOLOGY (ATE115C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Basic Electrical Technology. Measurement principles. Electrochemical energy storage and generation. Electromagnetic actuators and principles of sensors. Alternating Current Theory, generation, regulation, application. Digital techniques and field programmable gate arrays. Electronic Communication networks (CAN bus) and wireless networks (Android based). Project. (Total notional time: 140 hours)

B

BITUMEN AND ASPHALT TECHNOLOGY (BAT115C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

Bitumen and asphalt properties. Bitumen and asphalt tests and result interpretation and safety system. (Total notional time: 140 hours)

BUILDING COSTING AND ESTIMATING III (BCE306D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Science)

The cost of labour and plant, the hourly rate for labour and plant, excavation, filling, underpinning and shoring, brickwork, blockwork, concrete, reinforced concrete and formwork, roof covering and waterproofing, carpentry and joinery, partitions and drywalls, structural steel and metalwork, plumbing installation and drainage, finishes to walls, floors, decorative paper and painting, glazing, electrical and mechanical installations, pricing of preliminaries, tendering and tendering strategies. (Total notional time: 200 hours)

BUILDING PHYSICS AND SYSTEMS DESIGN I (BPS105P, BPS005P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Fundamental Building Physics and Systems Design, focusing on: (1) Basic principles. (2) Passive methodologies for a temperate environment. (3) Codes, standards, and guidelines. (4) Different systems supplying building services; and (5) The basic concept of structures. (Total notional time: 120 hours for BPS105P and 60 hours for BPS005P)

BUILDING PHYSICS AND SYSTEMS DESIGN II (BPS216P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Intermediate Building Physics and Systems Design, focusing on: (1) The basic theory of structures (Forces, moments, stresses, strains, Young's Modulus, structural components - including beams, columns and trusses); (2) Systems design thinking (Natural resources, human-made resources, resource efficiency and ecological design principles), and (3) Advanced systems supplying building services. (Total notional time: 60 hours)

BUILDING PHYSICS AND SYSTEMS DESIGN III (BPS307P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Advanced Building Physics and Systems Design, focusing on: (1) Unconditioned spaces. (2) Thermal zoning and compartmentalisation. (3) Indoor environmental quality. (4) Heating and cooling. (5) Renewable energy. (6) Green building rating systems, and (7) Application of structural theory to design architectural structures (using a project completed in the Architectural Design III module). (Total notional time: 120 hours)

BUILDING PHYSICS AND SYSTEMS DESIGN IV (BPS418P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Expert study of Building Physics and Systems Design, focusing on: (1) Material selection. (2) Schedules, sequences and affordability. (3) Quality in green building design and construction, and (4) Built environment rating tools. (Total notional time: 120 hours)

BUILDING TECHNOLOGY I (BTH105D) **1 X 4-HOUR PAPER**

(Module custodian: Department of Building Science)

Site establishment, substructure and setting out, concrete foundations such as footings, planking and strutting, open and closed boarding to sides of trenches, brickwork and different bonding, lintels and brick force, mortars, perpends, parapet walls, windows and doors, details at eaves and verges, roof coverings and rainwater goods, boarded ceilings, cornices, skirtings, various types of finishes, etc. (Total notional time: 200 hours)

BUILDING TECHNOLOGY II (BTH215D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Building Science)

Earthworks, concrete, formwork and reinforcement, brickwork and plasterwork, setting out of stairs, metalwork and structural steelwork, carpentry and joinery, plumbing and drainage (including rainwater goods, flashings and sanitary fittings and drawing using AutoCAD or drawing software and inclusion of BIM. (Total notional time: 100 hours)

BUILDING TECHNOLOGY III (BTH306D) **1 X 4-HOUR PAPER**

(Module custodian: Department of Building Science)

Site works (layout, temporary electricity, shoring, demolition, contaminated land remediation), plant and equipment (builder's plant, small tools, earth moving and excavation plant, transportation, mixers, advanced access systems), substructure (groundwater, deep excavations, shafts, tunnels, specialist piling, basements, underpinning), portal frames (theory, concrete portal frames, steel portal frames, timber portal frames), fire protection (problem of fire, structural fire protection, means of fire escape), claddings (panels, composite systems, jointing, mastics, sealants, gaskets, curtain walling, rain screen cladding, structural glass cladding, sustainable, energy efficiency, rainwater harvesting), formwork (patent formwork, finishes), pre-stressed concrete (principles, applications, systems), industrial buildings (factory roofs, walls, wind pressures, driving rain, partitions, doors, ceilings, painting, decorating), stairs (concrete, metal, glass, mechanical) and external works (roads, paving, slabs), precast claddings. (Total notional time: 200 hours)

BUSINESS DEVELOPMENT AND MANAGEMENT (BDM107V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Sciences)

This module equips students with knowledge of entrepreneurship and business management in application to the built environment context. Using the theory of creativity and innovation, students are equipped with methods and techniques for opportunity identification and evaluation. Students are exposed to the nature and the development of entrepreneurship. Students are exposed to legislation affecting entrepreneurship, post-startup challenges, managing growth within an enterprise, business failures and turnaround strategies, business ethics, corporate entrepreneurship and e-commerce. Students are expected to develop and present of sound business proposal. Manage risk on Built Environment Projects. (Total notional time: 240 hours)

BUSINESS MANAGEMENT I (BMN105D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Management and Entrepreneurship)

Introduction to the basic terminology, "language" and operational procedures relating to the efficient running of small, medium and micro-enterprises concerned with low-volume manufacture of products. Exposure to the fundamental realities of business, demonstrating how the disciplines, language and procedures covered are applied in product design and manufacturing enterprises. (Total notional time: 160 hours)

BUSINESS MANAGEMENT II (BMN206D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Management and Entrepreneurship)

Understanding specific commercial challenges presented in the medium to large manufacturing sector. Developing knowledge related to cost-effective product packaging, advertising, distribution, marketing and product branding, Point-of-sale and retail product presentation strategies. (Total notional time: 160 hours)

BUSINESS MANAGEMENT III (BMN306D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Management and Entrepreneurship)

Marketing management and general management, purchasing management, personal management and integration of all business management functions. (Total notional time: 160 hours)

BUSINESS MANAGEMENT V (BMN109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Office organisation, including managing oneself, the team and the business of architecture. Marketing and generating an income while establishing new business avenues. (Total notional time: 70 hours)

C

CADASTRAL SYSTEMS (CDS216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Introduction to property law and tenure legislation. Registration of Geomaticians and the requirements by the Geomatics profession. Cadastral Surveying in practice. (Total notional time: 120 hours)

CADASTRAL SYSTEMS FUNDAMENTALS (CDF216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

The module will compromise of the reviewing of the SA Property Law and tenure legislation. Registration of Geomaticians and the requirements by the Geomatics profession. The fieldwork that gives rise to documents prepared for land right registration will be covered in this module, requirements and accuracies as well as the regulations governing survey work focusing on cadastral survey. The diagrams and Plans that are used for the registration of land will be studied and practiced. (Total notional time: 120 hours)

CHEMICAL ENGINEERING DESIGN I (EQUIPMENT) (CEE317B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Heat exchangers - advanced design; Vapor-Liquid Separators - enhanced distillation and batch distillation design; Vapor-Liquid Separators - absorber design; Vapor-Liquid Separators - extraction column design; Solid-Liquid Separators - membrane separator design; Solid-Liquid Separators - crystalliser design. (Total notional time: 140 hours)

CHEMICAL ENGINEERING DESIGN II (PLANT) (CEL317B) **CONTINUOUS ASSESSMENT**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Nature of chemical process design and process economics; Optimisation methods applied in process design; Review of thermodynamic models and selection algorithm; Reactor and separator selection; Advanced distillation methods; Heat integration; and Plant Design Project. (Total notional time: 140 hours)

CHEMICAL ENGINEERING FUNDAMENTALS I (CF1115B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Introduction to chemical engineering calculations, Chemical engineering profession, units and dimensions, conversion, system of units, numerical calculations and estimation, validating results, dimensional homogenity and dimensionless quantities; process data representation and analysis; Processes and process variables, mass, volume, flow rate, chemical composition, pressure, temperature; Material balances, balance on batch and steady-state processes, balance calculations, balances on multiple-unit processes, recycle and bypass, chemical reactions stoichiometry, balances on reactive processes, and combustion. (Total notional time: 140 hours)

CHEMICAL ENGINEERING FUNDAMENTALS II (CF2115B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Energy and energy balances, forms of energy, energy balances on closed, and open systems, tables of thermo-dynamic data, energy balance procedures, mechanical energy balances; Energy balances on non-reactive processes, elements of energy balance calculations, heat capacities, phase change operations, Energy balances on reactive processes, heats of reaction, and reactive processes balances. (Total notional time: 140 hours)

CHEMICAL ENGINEERING THERMODYNAMICS I (CH1216B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Introductory concepts of thermodynamic systems, variables and significance of chemical engineering thermodynamics; properties of pure substance; first law of thermodynamics/heat and work; and second law of thermodynamic/entropy. (Total notional time: 140 hours)

CHEMICAL ENGINEERING THERMODYNAMICS II (CH2216B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Volumetric properties of pure fluids; Heat effects; Thermodynamics properties of fluids; Vapour/liquid equilibrium (VLE): introduction; Solution thermodynamics: theory; Solution thermodynamics: application; and Chemical reaction equilibrium. (Total notional time: 140 hours)

CHEMICAL PROCESS OPTIMISATION AND CONTROL (CPO216B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Introduction to process control and instrumentation; Theoretical model of chemical processes; Modelling for process control; Analysis of the dynamic behaviour; Overview of control system design; Analyses, design, tuning of feedback control system and frequency response analysis. (Total notional time: 140 hours)

CHEMICAL PROCESS TECHNOLOGY (CHP216B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Introduction to chemical and clean coal technologies; Renewable energy technologies processes; Petroleum refining; Pulp and paper manufacturing; Mineral processing; and Bulk chemicals production. (Total notional time: 140 hours)

CHEMICAL REACTION ENGINEERING I (CR1317B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Mole balances; Conversion and reactor sizing; Rate laws and stoichiometry; Isothermal reactor design; Collection and analysis of rate data; and Multiple reactions. (Total notional time: 140 hours)

CHEMICAL REACTION ENGINEERING II (CR2317B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Steady-state non-isothermal reactions; Catalysis and catalytic reactions; Mass transfer resistances effects in heterogeneous reactions: non-ideal reactors. (Total notional time: 140 hours)

CHEMISTRY (SEC115B) **1 X 2-HOUR PAPER**

(Module custodian: Department of Chemistry)

The Language Chemistry and Matter consists of Particles; The Atom; The Elements and the Periodic Table; Ionic and Molecular Compounds; Chemical equations and stoichiometric calculations; Redox reactions and electricity. (Total notional time: 80 hours)

CHEMISTRY (SEH115B) **1 X 2-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

This module provides knowledge for Civil Engineers on concepts used in the industry that need a basic chemical background. Concepts covered in the module are: Atoms, protons, neutrons, electrons, atomic and mass number, isotopes, the periodic table, molecules, empirical and molecular formula, ions, oxidation, reduction, naming chemical compounds, Bohr model, electron configuration of atoms, covalent bond, ionic bond, polar covalent bond, Hydrogen bond, single replacement reaction, double replacement reaction, combination reaction, decomposition reaction, balancing ionic and net ionic reactions, oxidation numbers, balancing redox reactions, moles, Avogadro's number, conversion of moles to mass/molecules, calculation of reaction mass, mole calculations in solutions, volume calculations of solutions, concentration calculations of solutions, calculation of percentage yield, hydration reaction of cement, role of gypsum as flash setting inhibitor, chemistry of extenders used in cement (GGBS, FA, CSF), chemical composition of various types of clay, the ion exchange reaction, chemical stabilisation of clay in soil, water purification process, coagulation, flocculation, sedimentation, filtration, chemical composition of bitumen and polymer modifiers used in bitumen, asphaltenes, resins, aromatics, saturates, production of penetration grade bitumen, types of penetration grade bitumen, types of modifiers. (Total notional time: 80 hours)

CHEMISTRY (CHE115B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Matter; Metallurgical reaction and stoichiometry; Periodic properties and elementals and metallurgical bonding; Metallurgical equilibria; Electrochemistry; and Introduction to organic chemistry. (Total notional time: 140 hours)

CIVIL ENGINEERING MATERIALS (CEM115B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

Identify various types of soil and rock. Understand the basic properties of soil. Perform various tests on soil to determine its properties (incl. calculations). Implement various methods to change and improve the properties of soil. Classify soil according to its properties. Describe and classify cement and concrete. Perform various tests on concrete to determine its properties (including calculations). Explain the properties of fresh concrete, concrete at an early age and hardened concrete. Design a concrete mix according to specifications as set out by the client. Change the properties of a concrete mix with the addition of admixtures to suit design needs. To introduce the student to steel used to reinforce concrete. Know how bitumen is produced. To classify the various bitumen products as used in the civil engineering industry. Perform various tests on bitumen to determine its properties (incl. calculations). Know how to apply bitumen in the civil engineering industry and implement the use of other construction materials like bricks, steel, geosynthetics and wood in the design of a construction project. (Total notional time: 140 hours)

CIVIL ENGINEERING PRACTICE (CEP317B) **1 X 3-HOUR PAPER (OPEN BOOK)**

(Module custodian: Department of Civil Engineering)

Engineering communication. Principles of management and management functions. Engineering ethics. Occupational health and safety. Principles of project management. Construction contracts and applicable law. Conditions of construction contract. Engineering specifications. Taking-off quantities and estimation of unit rates. Preparation of payment certificates. Tendering. (Total notional time: 140 hours)

CLINICAL ENGINEERING (CLE117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Advanced transducers and sensors; Environmental hazards management; sterilisation and systems; Applications of computers and computer networks in the medical field; Advanced measurement and analysis techniques; Modern imaging systems; Advanced therapeutic equipment; Clinical Engineering Project. (Total notional time: 140 hours)

CLINICAL ENGINEERING I (CLE216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Knowledge and understanding of the basic concept of Anatomy and Physiology as it relates to the Levels of Organisation of the human body. Knowledge and understanding of the organ systems responsible for support and movement, integration and coordination, transport and immunity and absorption and excretion in the human body. (Total notional time: 120 hours)

CLINICAL ENGINEERING II (CLE316D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Safety in the medical environment. Performance of systems and fault finding. Operational procedure for a workshop. Ionising radiation: Production and detection. Non-ionizing radiation: Production and detection. Medical Equipment. (Total notional time: 240 hours)

COMMUNICATION SKILLS (COM105X) **CONTINUOUS ASSESSMENT**
COMMUNICATION SKILLS (COS105X) **CONTINUOUS ASSESSMENT**
COMMUNICATION SKILLS (COS115X) **1 X 2-HOUR PAPER**

(Module custodian: Departments of Chemical, Metallurgical and Material Engineering, Electrical Engineering and Industrial Engineering)

The purpose of this module is to identify and apply basic competencies related to communicating in a technical or engineering environment. These competencies include presenting technical information to a variety of audiences, preparing technical reports, participating constructively in formal meetings and preparing a variety of business and technical documents. (Total notional time: 80 hours for COM105X, 60 hours for COS105X 50 hours for COS115X)

COMPUTATIONAL INTELLIGENCE (CIN118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Artificial neural networks; Evolutionary computing; Swarm intelligence; Fuzzy systems; and Probabilistic methods. (Total notional time: 150 hours)

COMPUTER-AIDED DESIGN (CDD115D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Introduction to computer-aided design (CAD), focused on Industrial Design requirements for various software application packages, component and assembly modelling, rendering and analysis. Students operate CAD software in order to produce three-dimensional models, providing a basis for more advanced CAD analysis and component engineering drawings. (Total notional time: 80 hours)

COMPUTER APPLICATIONS IN ARCHITECTURE I (CAR125P, CAR025P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Fundamental Computer Applications in Architecture, focusing on: (1) Raster and vector graphics editing software. (2) 3D modelling computer programs; and (3) Building information modelling software (BIM). (Total notional time: 120 hours for CAR125P and 60 hours for CAR025P)

COMPUTER APPLICATIONS IN ARCHITECTURE II (CAR226P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Intermediate Computer Applications in Architecture, focusing on Building information modelling software (BIM). (Total notional time: 60 hours)

COMPUTER APPLICATIONS IN ARCHITECTURE III (CAR327P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Advanced Computer Applications in Architecture, focusing on: (1) 3D modelling computer programs. (2) Building information modelling software (BIM); and (3) 3D Rendering software. (Total notional time: 180 hours)

COMPUTER APPLICATIONS IN ARCHITECTURE IV (CAR428P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Expert study of Computer Applications in Architecture, focusing on: (1) 3D modelling and computational design software. (2) Building information modelling software (BIM). (3) 3D Rendering software (artificial reality and virtual reality); and (4) Energy and thermal modelling software. (Total notional time: 120 hours)

COMPUTER HARDWARE V (CHH109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

An overview of all the current terminology, concepts and basics of computing hardware. Hardware support and software support for different operating systems. (Total notional time: 20 hours)

COMPUTER LITERACY (COL105X, COL115X, CML105X) **CONTINUOUS ASSESSMENT**

(Module custodian: End User Computing Unit)

This module provides foundational knowledge in computing fundamentals, essential digital skills in key applications based on MS Office Suite, network basics (i.e., MS Outlook and Internet) and introduction to Programming languages. Online exams are mapped with End-User Computing: SAQA 49077 (61591) Core Element as well as Internet and Computing Core Certification (IC3). (Total notional time: 100 hours for CML105X and 50 hours for COL105X and COL115X)

COMPUTER SURVEY DRAWING (CSD115B, CSD115D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Geomatics)

Introduction to Drawing. Engineering Drawing Standards. Projections and Elevations. Manual Drafting and engineering surveying drawings. Cadastral and Topographical Mapping. Digital Design of Drawings. Introduction to Model maker. Introduction to Surpac. Digitising Cadastral Plans. (Total notional time: 120 hours)

CONCRETE AND AGGREGATE TECHNOLOGY (ECC115C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

Aggregate properties. Aggregate tests and result interpretation. Concrete properties. Concrete tests and result interpretation and Safety system. (Total notional time: 140 hours)

CONSTRUCTION I (CST105P, CST005P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Fundamental Building Construction, focusing on: (1) A visual lexicon of the South African dwelling. (2) A single-storey building, including: The building site; Foundation, basement, floor, wall and roof systems; Building envelope; Construction materials, construction methods and detailing; Moisture and thermal protection; Building services, fittings and finishes; and Special construction. (3) Relevant SANS 10400 and other regulations, standards and codes; and Preparing a set of working drawings for Local Authority submission adhering to all the applicable conventions (using a project completed in the Architectural Design I module). (Total notional time: 180 hours for CST105 and 90 hours for CTS005P)

CONSTRUCTION II (CST216P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Intermediate Building Construction, focusing on: (1) A double-storey building with a basement; The building site; Foundation, basement, floor, wall and roof systems; Building envelope; Construction materials, construction methods and detailing; Moisture and thermal protection; Building services, fittings and finishes; and Special construction. (2) Relevant SANS 10400 and other regulations, standards and codes; and (3) Preparing an advanced set of working drawings for Local Authority submission adhering to all the applicable conventions (using a project completed in the Architectural Design II module). (Total notional time: 120 hours)

CONSTRUCTION III (CST307P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Advanced Building Construction, focusing on: (1) Structural design of high-rise buildings with multi-level basements; (2) Technical properties and applications of construction materials and methods. (3) Building services, fittings and finishes. (4) Relevant SANS 10400 and other regulations, standards and codes, and (5) Preparing design development drawings and a full-scale model of the detail representing the whole (using a project completed in the Architectural Design III module). (Total notional time: 180 hours)

CONSTRUCTION IV (CST418P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Expert study of Building Construction, focusing on: (1) Advanced construction within Industrial Economies. (2) Building typologies and precedent studies. (3) Building regulations and codes in the context of climate change. (4) Pertinent green building rating tools and (5) Component and detail drawings. (Total notional time: 180 hours)

CONSTRUCTION ACCOUNTING III (CAN306D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Accounting)

Introduction to accounting and the conceptual framework with the accounting equation, the accounting cycle: transactions, source documents, journals, ledgers, the accounting system leading to the trial balance with adjustments, end of year closing procedures and financial statements for financial accounting, cash and bank reconciliation, partnerships and companies, budgets and statement of cash flows for management accounting and taxation. (Total notional time: 200 hours)

CONSTRUCTION CONTRACTS AND ADMINISTRATION (CCS107V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Sciences)

Built Environment project procurement systems; The profile of clients; Alternative types of contract documents; Collecting client information; Evaluating project procurement systems; Undertake built environment project buildability analysis; Recommending and agreeing on the choice of price determination; Accessing and distributing input documents and trends in development of Procurement methods; Introduction to finals accounts; Preparing to compile the final account; Conducting negotiations on claims settlement; Claims and status reports; Drafting the final account; Unpacking specific clauses in the following contracts: JBCC PBA, JBCC Minor works, GCC 2014, NEC4, FIDIC; and Contract Pricing Strategies. (Total notional time: 240 hours)

CONSTRUCTION DISPUTE RESOLUTION (CDN108G, CDU108G) 1 X 3-HOUR PAPER (OPEN BOOK)
(Module custodian: Department of Building Sciences)
Disadvantages of litigating in building disputes, Advantages and Goals of Alternative Dispute Resolution (ADR). The meaning of ADR in the construction industry. The general stages of disputes and conflict management, Dispute avoidance, Attributes of ADR to be used as an evaluation tool for the selection of appropriate dispute resolution processes. Overview of existing dispute resolution options; Adjudication, Mediation, Conciliation, Dispute review board (DRB) and dispute adjudication board (DAB), Negotiation, Mini-trial, Independent expert determination, Arbitration, Litigation. ADR in the CIDB endorsed construction contracts; JBCC Series 2000, General Conditions of Contract for Construction Works, Second edition 2014, FIDIC (Red, yellow, green and silver books), New Engineering Contract (NEC 4). Understand the basic principles of dispute resolution in the SA construction Industry. (Total notional time: 240 hours)

CONSTRUCTION ECONOMICS (CEC107V) 1 X 3-HOUR PAPER
(Module custodian: Department of Building Sciences)
Construction economics and sustainable development; Property economics, fiancé and strategic investments; Project cost information database compilation; Financial feasibility studies and risk management for built environment projects; Whole life appraisals of built environment; and Value management processes on built environment projects. (Total notional time: 240 hours)

CONSTRUCTION ECONOMICS V (CEC109M) 1 X 3-HOUR PAPER
(Module custodian: Department of Building Sciences)
Introduction to Construction Economics. Micro- and Macro-Economics concepts and perspectives for the Construction Industry. South African Legislation relevant to investment Market analysis and investment environment. Risks analysis and investment appraisal in construction; Time and value for money. Discounted cash flows. Development budget and control. Property investment, and financial engineering for construction projects. Feasibility studies and life cycle costing. Property valuation and development. Property maintenance management and facilities management and the economics of sustainability and green buildings. (Total notional time: 180 hours)

CONSTRUCTION HEALTH AND SAFETY MANAGEMENT (CHF108G) 1 X 3-HOUR PAPER
(Module custodian: Department of Building Sciences)
This module covers the fundamental aspects of safety and health, applicable standards, risk management, performance metrics, hazard recognition/controls, industrial hygiene, environmental management, fire safety, systems safety, ergonomics, hazardous materials, fleet safety, emergency management, and accident investigation. The scope is not limited to occupational health and safety, evolutionary development, core principles, aims, national policy, system and programs. Health and safety legislation and regulatory framework, enforcement and collective agreements, compliance, rights, responsibilities and duties of the worker, employer and government. Occupational hazards and risks. Health hazards and risks, preventative measures and controls. Accidents, hazards, risk and worker safety, work practices and assessment, accident prevention. Liability. Occupational health and safety policy within the enterprise. Management of health and safety: scope, commitment, resources, worker participation, training, planning and control, organisational prioritisation and the occupation health and safety management cycle. (Total notional time: 240 hours)

CONSTRUCTION MANAGEMENT (CUS129N) CONTINUOUS ASSESSMENT
(Module custodian: Department of Industrial Engineering)
Introduction to construction project management, Financial planning and control, Planning techniques, Personnel and conflict management, Communication management, Risk management, Quality management, Procurement management, Contract strategies and management, Construction productivity (Total notional time: 150 hours)

CONSTRUCTION MANAGEMENT I (CUM105D) 1 X 3-HOUR PAPER
(Module custodian: Department of Building Science)
Parties involved in the construction process, Organisations involved in the construction, Management functions and components, Procurement processes such as tendering, Construction organisations and their structures, Contract administration, and Introduction to Human Resources. (Total notional time: 200 hours)

CONSTRUCTION MANAGEMENT II (CUM215D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Building Science)
Introduction to management and management functions, Labour law and industrial relations and legislation (unfair dismissals, misconduct, etc.) LRA and an introduction to the employment contract, introduction to the construction site, material management, plant and machinery management, subcontractor and personnel management, information management, productivity work-study and site management health and safety. Practical assignments using Microsoft Projects and MS Excel as planning tools. (Total notional time: 100 hours)

CONSTRUCTION MANAGEMENT III (CUM306D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Building Science)
Introduction to construction project management, financial planning and control, planning techniques, personnel and administration management, communication management, risk management, quality management, procurement management, contract strategies and management. (Total notional time: 200 hours)

CONSTRUCTION MANAGEMENT PROFESSIONAL PRACTICE (CGR118G) **1 X 3-HOUR PAPER**
(Module custodian: Department of Building Sciences)
Construction and Project Management as a profession, Legal dimensions of a practice, Registration of a practice, Professional ethics, developing a practice, starting up, Legal structure, Individual / Sole proprietor, Partnership, Close corporations, Companies, Focusing the practice, Marketing, running a practice, Administration, Financial planning, Insurance coverage, Personnel, Hiring. Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997), Client agreements, Client Consultant Professional Services Agreement (PROCSA), Professional fees. CM/CPM IDOW. Professional Ethics. (Total notional time: 240 hours)

CONSTRUCTION MATHEMATICS (COI115D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Mathematics and Statistics)
Basic mensuration mathematics, basic arithmetic, basic algebra, basic trigonometry, basic geometry, introduction to vector algebra and linear algebra, introduction differentiation and integration. (Total notional time: 100 hours)

CONSTRUCTION PROJECT MANAGEMENT (COJ108G, CPJ108G) **1 X 3-HOUR PAPER**
(Module custodian: Department of Building Sciences)
Construction project management ensures that the candidates appreciate the importance of managing construction projects from inception until their completion. Construction project management is paramount to the construction industry to ensure that construction projects are delivered successfully to the client by achieving the core constraints of the project (time, cost, quality, health and safety, scope and ultimately the clients' satisfaction). When contributing to the content of this module to fulfil the objectives stated above, the module matter expert will delve into several discussions: The IDoW taps into the ten core functions of the Project Management Body of Knowledge (PMBoK) which is published by the Project Management Institute. (Total notional time: 240 hours)

CONSTRUCTION SAFETY AND QUALITY MANAGEMENT (CSQ117V) **1 X 3-HOUR PAPER**
(Module custodian: Department of Building Sciences)
Fundamentals of health and safety: Legislative framework for health and safety: Health and safety management plan; Hazard identification and risk assessment; Sub-contractors' health and safety compliance risk; Economics of Construction health and safety; Construction environmental management; and Quality management principles and practice. (Total notional time: 120 hours)

CONSTRUCTION STRATEGIC MANAGEMENT (CSG118G) **1 X 3-HOUR PAPER**
(Module custodian: Department of Building Sciences)
This module is designed to study strategic management in construction organisations. This module aims to explain the role of corporate strategic management within the construction industry. The module examines the evolution of strategic management concepts from the 1960s to the present day. These concepts are then related to current research and thinking about the creation, culture and context of strategy. (Total notional time: 240 hours)

CONTRACTS (CTS116S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Civil Engineering)
The place of the law of contract; Concept of contract; Requirements of valid contracts; Mistakes, duress, misrepresentation and undue influence; Valid, void and voidable contracts; Termination of contracts; Remedies available to affected parties; and Legal rules. (Total notional time: 50 hours)

CONSTRUCTION MANAGEMENT (CPM105C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

Basic principles of management. Organisational structures. Procurement and storage of materials, plant and equipment. Cost control of resources. Safety and occupational health in the workplace. Engineering ethics. Sustainable development and legal Issues in the construction industry. (Total notional time: 210 hours)

CONSTRUCTION MATERIALS AND METHODS (CMR109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

This module builds on an existing knowledge base to develop an in-depth understanding of contemporary building construction materials and methods. The performance criteria of detailing are studied alongside intelligent buildings and building automation. Resource efficiency, sustainable technologies and relevant building codes and standards are integrated into various themes explored in the module. (Total notional time: 180 hours)

CONSTRUCTION MATERIALS V (CSM109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Contemporary materials for building applications based on case studies. (Total notional time: 70 hours)

CONSTRUCTION METHODS V (KME109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

The performance criteria of detailing. Post-construction analyses using case studies. Building standards, specifically Part XA of SANS 10400. Intelligent buildings and building automation. Complex structures. (Total notional time: 70 hours)

CONSTRUCTION PRINCIPLES (CSP115B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

Basic principles of construction project. Characteristics of construction project. Basic concepts of construction technology. Measurement and assessment techniques. Construction models (phases). Capacities of machinery versus production. Assessment and testing of materials. Pavement materials. Assessment and qualification of foundations, structures and pavements. Assess and qualify the design and construction of single and double stone surfacing. Assess and design sand seals, slurries, emulsions, rigid and flexible pavements and maintenance, rehabilitation, and Construction of pavements and structures. (Total notional time: 140 hours)

CONTRACT DOCUMENTATION V (CDO209M/R) **PROJECT ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

This module is based on the design prepared as part of the research report. A selected portion of the design is developed in detail and technically resolved. The module is presented as a set of design development drawings and a detail model. (Total notional time: 100 hours)

CONTROL OF MACHINES (CMH316B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to equip the student with a fundamental understanding of electropneumatics and hydraulics and their associated control systems in an industrial setting. (Total notional time: 140 hours)

CONTROL SYSTEMS (CNS117V) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Basics of Control Systems; Classical Modelling methods (in the frequency domain and time domain); Classical System Analysis methods (time domain and frequency domain, Transient Response and Steady State Errors); Classical Stability analysis methods (Root Locus Techniques and Frequency Response); Classical Controller Design (Root Locus Techniques and Frequency Response); Modern Control Theory; Modelling in State Space; System Analysis in State Space; Controller and Observer Design in State Space Practical and Project. (Total notional time: 140 hours)

CONTROL SYSTEMS (CNS118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

In this subject, students will extend their traditional control system knowledge to more advanced developments. A comprehensive review is firstly made to clarify the "why" and "how" the control system theory and technology were developed, followed by modern and intelligent control methods. Digital control systems, Fuzzy logic control, Lyapunov stability analysis, LQR optimal control, Neural Network control, and Computational intelligence in control will be studied. The module aims to prepare students for higher level study (such as the Master of Engineering), and advanced applications in industry. (Total notional time: 150 hours)

CONTROL SYSTEMS (CNS216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Control System basics; modelling in the frequency domain; time response; reduction of multiple subsystems; stability; steady-state errors; root locus techniques; frequency response techniques. (Total notional time: 120 hours)

CONTROL SYSTEMS (CNS307B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Introduction to Control Systems; Modelling in the frequency domain; Modelling in the time domain; Time response; Reduction of Multiple sub-systems; Stability; Steady State Errors; Root Locus Techniques and Design via Root Locus; Frequency Response and Design via Frequency Response; Modern Control Theory (Modelling, System Analysis, Controller and Observer Design in State Space); Practical and Project (Design, model and simulate a state space controller for physical systems with the provided criteria and specifications). (Total notional time: 280 hours)

CONVERSION SYSTEMS (CVS118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Converter theory; Electromechanical systems; Electric materials; Electromagnetic field calculation, distribution (non-linear and transient problems, numerical methods, applications); Transmission planning; and Transmission system design. (Total notional time: 150 hours)

CONVERSION SYSTEMS (CVS216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Magnetic Circuits. Single-Phase Transformers. Three-Phase Transformers. DC Machines. (Total notional time: 140 hours)

CONVERSION SYSTEMS (CVS117V) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Synchronous Machines; Three-Phase Induction Machines; Three-Phase Synchronous Machines Design; Power Converters. Group Project and an Individual Project. (Total notional time: 140 hours)

CORROSION (COR317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Fundamentals of Corrosion; Corrosion Electro Metallurgical; Corrosion Thermodynamics; Identification of different types of Corrosion, Failure and Prevention; Corrosion in water, atmospheric conditions and high-temperature corrosion. (Total notional time: 140 hours)

D

DATA ANALYSIS (DAN118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Exploring data; Describing the distribution of a simple variable; Finding relationships amongst variables; Probability and decision-making under uncertainty; Probability and probability distribution; Normal, binomial, Poisson and exponential distributions; Statistical inference; Sampling and sampling distributions; Confidence interval estimation; Hypothesis testing; and Regression analysis; and Regression analysis - estimating relationships. (Total notional time: 100 hours)

DESCRIPTIVE QUANTIFICATION I (DQU105D) **1 X 4-HOUR PAPER (PRESCRIBED OPEN BOOK)**

(Module custodian: Department of Building Science)

Introduction to the quantity surveying profession, traditional measurement principles, applied building mensuration (lengths, areas, volumes), standard systems of measuring building work, measurement of foundations, floors and super structure for a single storey building, measurement of roofs and rainwater disposal, measurement of finishes to floors, walls and ceilings, measurement of windows and window adjustments, measurement of doors and plain openings and adjustment for doors and plain openings, measurement of basic services and external works. (Total notional time: 200 hours)

DESCRIPTIVE QUANTIFICATION II (DQU215D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Building Science)
Overview of the Descriptive Quantifiaction I module, computerised measurements such as WinQS, QS Plus, CCS and traditional measurement for single storey structure elements. Manage production processes of price determination documents for Built Environment Projects. (Total notional time: 100 hours)

DESCRIPTIVE QUANTIFICATION III (DQU306D) **1 X 4-HOUR PAPER (PRESCRIBED**
(Module custodian: Department of Building Science) **OPEN BOOK)**
Measurement of site clearance, measurement of Reinforced Concrete Framed Structures including the measurement principles for various RC elements such as upstand/ inverted beams, nibs and recesses and columns of various shapes, measurement of special finishes, measurement of RC staircases, reinforcement, payment certificates and Haylette and escalation, professional quantity surveying practice and computerised measurements. (Total notional time: 200 hours)

DESIGN OF MACHINES (DOM206B, DOM216B) **1 X 3-HOUR PAPER (PRESCRIBED**
(Module custodian: Department of Mechanical and Mechatronics Engineering) **OPEN BOOK)**
The purpose of this module is to develop the advanced knowledge and understanding of the student in the process of problem assessment and design. At the end of this module, provided that the student has completed all tutorials, assignments and presentations successfully, the student will have a theoretical and practical understanding and knowledge of problem definition, design, communication and computer skills, use of engineering science and knowledge, and can undertake advanced tasks related to the design of components, assemblies

DESIGN PROJECTS (DPE316D) **PROJECT ASSESSMENT**
(Module custodian: Department of Electrical Engineering)
This module covers the concepts and implementation of the design of electrical engineering systems. This includes the context of electrical engineering technology systems design (the technology-based organisation), systems engineering concepts (from problem-solving to design implementation), and practical implementation, including circuit design, construction and documentation. Assessment is through open-book tests, a research topic, a practical project and a final presentation. (Total notional time: 120 hours)

DESIGN STUDIES IV (DST107V) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Independently apply design thinking to design problems within the local formal or informal sectors. The student should therefore be capable of integrating, interpreting and applying knowledge from a range of disciplines to respond to changing technologies, materials and social environments to design thinking solutions selected from diverse fields of business. (Total notional time: 200 hours)

DESIGN THEORY (DTH306D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Expanded design observation, awareness, reflection, argument, reading and writing skills. (Total notional time: 160 hours)

DEVELOPMENT MANAGEMENT V (DEM109M) **1 X 3-HOUR PAPER**
(Module custodian: Department of Building Sciences)
Introduction to Concepts in Infrastructure Development. Concepts in property development. Principles of Urban Economics. Town Planning and Development Control. Township Development; Residential Property Development. Commercial Property Development. Industrial Property Development. Traffic, Parking and Public Utilities. Environment and Stakeholders in Development. Development Policy formulation. Organisational Structures of Development Entities. Public Finance and Management. Supply Chain Management. Production Planning and Control and Project Management. Legal Implications for Infrastructure Development and Dispute Resolution. (Total notional time: 180 hours)

DIGITAL COMMUNICATIONS (DCM118S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Electrical Engineering)
Signals and spectra; Source coding; Formatting and baseband modulation; Baseband demodulation or detection methods; Band-pass modulation and demodulation/detection methods; Channel coding and decoding techniques. (Total notional time: 150 hours)

DIGITAL ENTERPRISE (DGN118S) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The digital enterprise; Holistic approach to optimising the entire value chain; Digital twin. (Total notional time: 200 hours)

DIGITAL SYSTEMS IA (DSA115D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Introductory digital concepts; Number systems (Decimal, Binary, Hexadecimal, and Octal); Logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR), Boolean Algebra, Karnaugh Maps, Design Techniques and Code Converters; Combinational Logic: Adders, Comparators, Multiplexers, Demultiplexers, Encoders, Decoders. Use of Data Sheets in an application environment. (Total notional time: 120 hours)

DIGITAL SYSTEMS IB (DSB215D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Basic components of sequential circuits namely latches and flip-flops. How more complex memory components, such as counters (Asynchronous, Synchronous and UP/DOWN) and registers, can be built from the basic components. Different analogue-to-digital and digital-to-analogue converters. TTL and CMOS-integrated circuit technologies, multivibrators and electronic display units. Introduction to programmable logic devices (PLD). Use of RAM memories in digital applications. Use of data sheets in an application environment. (Total notional time: 120 hours)

DIGITAL TECHNOLOGY (DSY115C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Introductory digital concepts; Number systems (Decimal, Binary, Hexadecimal, and Octal); Logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR), Boolean Algebra, Karnaugh Maps, Design Techniques and Code Converters; Combinational Logic: Adders, Comparators, Multiplexers, Demultiplexers, Encoders, Decoders, Code converters. (Total notional time: 140 hours)

DYNAMICS (DYN317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to equip the student with a foundational framework of dynamics. A large section of this module deals with “vibration” which is a sub-discipline of dynamics and deals with repetitive motion. In most mechanical systems and structures, vibration is unwanted and even destructive. The task of this unit is to teach the student how to analyse vibration, using principles of dynamics. The concepts and formulations presented in this module are intended to provide the skills needed for designing vibration systems with desired properties that enhance vibration when it is wanted and reduce vibration when it is unwanted. (Total notional time: 140 hours)

E

ELECTRICAL CIRCUITS (ELC105B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Direct current circuits. Magnetism and electromagnetism. Single-phase alternating current systems. Active components in electric circuits. Alternating current with passive and active components in electric circuits. Three-phase alternating current systems. (Total notional time: 280 hours)

ELECTRICAL ENGINEERING IA (EEA115D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Basic Electrical Technology (DC); Electrical Circuits (DC); Electrostatics (DC); Magnetism and electromagnetism; Alternating Current Theory; and Alternating Current Circuits; Electrical System Networks. (Total notional time: 120 hours)

ELECTRICAL ENGINEERING IB (EEB115D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Single-Phase AC Circuits; Power in AC Circuits; DC and AC Circuit Analysis; Harmonics; Three Phase System; Single Phase and Three Phase Transformers. (Total notional time: 120 hours)

ELECTRICAL ENGINEERING II (ELE216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Three-phase balanced and unbalanced circuits. Symmetrical components and short-circuit and open-circuit problems. Per-unit and basic fault-current calculations. Power in three-phase systems. Power and energy measurements in three-phase circuits. Illumination. Single-phase transformers. (Total notional time: 120 hours)

ELECTRICAL INSTALLATION (ELN115C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Introduction to wiring domestic and commercial circuits according to SANS standards. Understanding of installation rules, interpreting electrical drawings, wiring of single-phase and three-phase, and commissioning of electrical circuits. Safety procedures related to job requirements. (Total notional time: 140 hours)

ELECTRICAL MACHINES (EMH216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Electromechanical Energy Conversion Principles and Laws; DC Machines; Induction Motors; Three-Phase Transformers; Electric Motor and Drive Selection, and Sizing and Applications. (Total notional time: 120 hours)

ELECTRICAL POWER ENGINEERING (EPE316B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

The purpose of this module is to provide an understanding of the use of electrical power in the working of machines and drives. (Total notional time: 140 hours)

ELECTRICAL TECHNOLOGY (EEN115C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Basic Electrical Technology (DC). Electrical Circuits (DC). Electrostatics (DC). Magnetism and electromagnetism. Alternating Current Theory. Alternating Current Circuits. Electrical System Networks. (Total notional time: 140 hours)

ELECTROMAGNETIC FIELDS AND WAVES (EFW117V) **1 X 2-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Introduction; Electric and Magnetic Fields; Transmission Lines, Wave Propagation; Project - electromagnetic systems. (Total notional time: 70 hours)

ELECTROMAGNETIC FIELDS AND WAVES (EFW216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Introduction; Electric and Magnetic Fields; Transmission Lines, Wave Propagation; Project - electromagnetic systems. (Total notional time: 140 hours)

ELECTRONIC APPLICATION I (EAP216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

BJT amplifier design; MOSFET amplifier design; Multistage amplifiers; Differential amplifiers; Power amplifiers and output stages; Feedback networks; Amplifier frequency response; Op-amp limitations and non-ideal op-amps; Feedback oscillators; Relaxation oscillators and multi-vibrators. (Total notional time: 120 hours)

ELECTRONIC APPLICATION II (EAP316D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Practical transducer circuits; Operational amplifier circuits; Analog multipliers; Active filters; Signal generators; Reference circuits; Sample electronics; Communication electronics; and Switch-mode supplies. (Total notional time: 240 hours)

ELECTRONIC APPLICATIONS (EAP117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Models for integrated-circuit active devices; BJT, MOS and BiCMOS integrated technology; Single and multiple-transistor amplifiers; Current mirrors, active loads and references; Output stages; Fully differential amplifiers and differential amplifiers with single-ended outputs; Noise in integrated circuits; Non-linear analogue circuits. (Total notional time: 140 hours)

ELECTRONIC ASSEMBLY (ELA115C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Introduction to manufacturing and production processes; Tools, components and PCB selection and preparation; Through-hole assembly techniques; Surface mount assembly techniques; Cleaning, inspection, testing, and packaging of electronic assemblies. (Total notional time: 140 hours)

ELECTRONIC CIRCUITS (ELS105B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Identification of electronic components. Basic circuit calculations. Understanding of different electrical signals use. Electrical measurements using the laboratory equipment. Conduction in semiconductors and analysis, design and building of basic power supply circuits. Current flow in transistors and analysis, design and building of single transistor circuits. Design and building of practical op-amp application circuits. Design, analysis and building of practical power supplies. Analysis, design and building of different small signal amplifier configurations. (Total notional time: 280 hours)

ELECTRONIC COMMUNICATION (ECM117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Source and Channel Coding in Digital Communication; Error Detection and Correction in Digital communication; Multiplexing and Media Access Techniques in Wireless Communication; Mobile and Fixed IP Networks; Telecommunication Applications and Services. (Total notional time: 140 hours)

ELECTRONIC COMMUNICATION I (ECM216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Introduction to Communication Systems. Amplitude Modulation (Transmission and Reception). Frequency Modulation (Transmission and Reception). Transmission Lines. Radio Wave Propagation and Antennas. Communication Technologies. (Total notional time: 120 hours)

ELECTRONIC COMMUNICATION II (ECM316D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

This module covers modern electronic communication areas with intensive hands-on skills on the use of emer-ging electronic communication tools such as SDR techniques. The contents are namely, Introduction to Software-Defined Radio (SDR) Techniques; Digital Communication Fundamentals; Code Error Detection and Correction; Wired Digital Communications; Wireless Digital Communications; Antennas; Introduction to Communication Networks and Protocols; and Projects in Application Areas such as Digital Television, Radio and Microwave Communication Systems. (Total notional time: 240 hours)

ELECTRONIC TECHNOLOGY (ETY115C) **1 X 3 HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Passive and active components, Diodes and special diodes; Power supply construction; Bipolar Junction Transistors; Field Effect Transistors; Introduction to signal analysis. (Total notional time: 140 hours)

ELECTRONICS IA (ETA115D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Passive and active components, Diodes and special diodes; Power supply construction; Bipolar junction transistors; Field effect transistors; Introduction to signal analysis. (Total notional time: 120 hours)

ELECTRONICS IB (ETB115D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Modelling of electronic components and their application in circuit analysis and design. Unregulated and regulated linear power supplies with transistor and operational amplifier error correction, short-circuit protection and heat sink principles. Small-signal modelling of transistor amplifiers. The theory is supported by assessed projects and practical experiments in a laboratory. (Total notional time: 120 hours)

EMBEDDED SYSTEMS (EBS117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

16-bit Micro controllers; Digital Communication Protocols and standards; Wireless communication; Serial-Interface electrical standard; Peripherals. (Total notional time: 140 hours)

EMBEDDED SYSTEMS A (EB216AB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Introduction to digital concepts. Number systems (Decimal, Binary, Hexadecimal, Octal), Operations, and Codes. Logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR), Boolean Algebra and Logic Simplification (Karnaugh Maps). Combinational Logic analysis (universal properties of NAND and NOR gates). Design Techniques and Functions of Combinational Logic. (Code converters, Adders, Comparators, Multiplexers, De-multiplexers, Encoders, and Decoders). Latches, Flip-Flops, and timers including the use of 555 Timers. Shift registers. Asynchronous and Synchronous counters. Apply simulation programs, such as Proteus, to enable an understanding of debugging techniques to resolve software and hardware problems. (Total notional time: 140 hours)

EMBEDDED SYSTEMS B (EB216BB) **1 X 4-HOUR PAPER (OPEN BOOK)**

(Module custodian: Department of Electrical Engineering)

Data Storage (RAM, EEPROM, FLASH ROM, etc.). The architecture of the 8-bit ATMega328P microcontroller. Arduino UNO 3 hardware. Microchip/ATMEL Studio as IDE. Programming the Arduino UNO hardware. Computer Concepts and Microcontrollers. Embedded C language programming and the use of flowcharts. I/O Port Setup and programming applications, e.g. I/O activation, Pull-up resistor activation, I/O programming, connecting switches/LEDs/hex keypads/sensors to ports, etc. Arithmetic and logic functions in C Language. Binary to BCD conversion. The use of 7-segment display devices. ADC applications (8-bit, 10-bit and 12-bit), including the internal ADC of the AVR, scaling techniques, and connecting sensors to ADCs. AVR Interrupts (external interrupts, pin change interrupts, timer interrupts, comparator interrupts, etc.). Operation of Timers (Normal mode and CTC mode) and Counters in the microcontroller. Writing and reading data using the internal EEPROM of the AVR. (Total notional time: 140 hours)

EMBEDDED SYSTEMS I (EBS216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

The emphasis is on computer memory and the application of a microcontroller. Characteristics of Read-Only Memories (ROM, EPROM, EEPROM, FLASH and RAM). Expansion of memory such as data bus, memory locations (size) and a combination of both. The micro-controller architecture, memory arrangements of the micro-controller, interrupts and vector addresses, timers/counters and serial communication as well as the connection and control of peripheral devices such as ADCs, keypads, and LCD displays will be examined. The design and implementation of software and hardware for applications is supported by flow charts, assembly language and C language and forms an important component of the module. After completion of the module, a student will be able to design and write programs to solve real-life problems in industry. (Total notional time: 120 hours)

EMBEDDED SYSTEMS II (EBS316D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

The emphasis in this module is on communication methods (Electrical standard) and communication protocols as well as the use of additional peripherals apart from those studied in Embedded Systems I. Communication protocols like Modbus will be examined and implemented. Inter-Integrated Communication (I2C), RS 422, RS 485, RS 232, RS 423 and SPI will be implemented. Peripherals namely UART's, Real Time Clock, ADCs, LCDs, IO port expanders, EEPROM memory connection and implementations will be investigated. The implementation of different interrupts will be examined. The design and implementation of software and hardware for applications is supported by flow charts and embedded language programs. After completion of the module, a student will be able to solve real-life problems in industry using the relevant hardware, as well as flow charts and embedded language programs. (Total notional time: 240 hours)

ENERGY ECONOMICS AND POLICY (EPY116S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Energy management; Energy accounting; and Energy systems and renewable energy. (Total notional time: 50 hours)

ENERGY EFFICIENCY AND DEMAND SIDE MANAGEMENT (EDM118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Energy management programme design; Energy management audit; Energy management process assessment; Control and process systems; and Corporate governance and good practices. (Total notional time: 150 hours)

ENERGY MANAGEMENT (EGM129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Energy Supply Systems, Advanced Energy Conversion and Use, Renewable Energy Technologies, Energy Management Principles and Practice, Global and National Energy Needs, Sustainable Building Design, Distributed Generation, Energy Economics, Energy Control Systems, Revision, Feedback, Case Study and Group Presentation (Total notional time: 150 hours)

ENGINEERING BUSINESS DYNAMICS (EBU129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Introduction and fundamental concepts, System thinking and critical thinking, System dynamics process, Conceptual Models, Complex Models, Supply chain problems, and The decision process. (Total notional time: 150 hours)

ENGINEERING BUSINESS MANAGEMENT (EBM307B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Cost accounting and financial management in engineering projects, strategies for allocation of cost as well as the tools to assist in decision-making to optimise business success through making good choices. Analyse and interpret engineering financial reports. Human aspects in project management are addressed and dealing with teams and the approaches to managing change. Software utilised in the industry for financial analysis is considered. (Total notional time: 280 hours)

ENGINEERING CHEMISTRY (ENC115C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

This module provides knowledge for Civil Engineers on concepts used in the industry that need a basic chemical background. The Concepts covered in this module are: Atoms, protons, neutrons, electrons, atomic and mass number, isotopes, the periodic table, molecules, empirical and molecular formula, ions, oxidation, reduction, naming chemical compounds, Bohr model, electron configuration of atoms, covalent bond, ionic bond, polar covalent bond, Hydrogen bond, single replacement reaction, double replacement reaction, combination reaction, decomposition reaction, balancing ionic and net ionic reactions, oxidation numbers, balancing redox reactions, moles, Avogadro's number, conversion of moles to mass/molecules, calculation of reaction mass, mole calculations in solutions, volume calculations of solutions, concentration calculations of solutions, calculation of percentage yield, hydration reaction of cement, role of gypsum as flash setting inhibitor, chemistry of extenders used in cement (GGBS, FA, CSF), chemical composition of various types of clay, the ion exchange reaction, chemical stabilisation of clay in soil, water purification process, coagulation, flocculation, sedimentation, filtration, chemical composition of bitumen and polymer modifiers used in bitumen, asphaltenes, resins, aromatics, saturates, production of penetration grade bitumen, types of penetration grade bitumen, types of modifiers. (Total notional time: 70 hours)

ENGINEERING DESIGN I (EGG115D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Identify and gain experience in the use of basic engineering elements in products and product design. Become aware of underlying principles/approaches and thinking in engineering design. (Total notional time: 80 hours)

ENGINEERING DESIGN II (EGG216D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

The purpose of this module is to identify and gain experience in the use of complex engineering elements in products and product design. Instill an engineering design approach/process as an optional way of thinking about design problems. (Total notional time: 80 hours)

ENGINEERING EDUCATION (EGU116S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Higher education environment; Teaching and learning methods; Assessment; and Lecture planning and design. (Total notional time: 50 hours)

ENGINEERING FINANCE (EFI129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Time value of money, Financial statement analysis and interpretation, Working capital management, Investment in capital projects, Business valuation, Mergers, Cost analysis and behaviour patterns, Costing systems and cost allocation, Budget planning and control, Performance appraisal through statement analysis, Activity-based accounting, South African taxation system. (Total notional time: 150 hours)

ENGINEERING GRAPHICS (EGL105C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Mechanical and Mechatronic Engineering)

Introduction to graphics communication. Dimensioning and tolerance practices. Geometrical construction. Pictorial projections. Interpenetration and development. Machine drawings. Civil drawings including electrical diagrams. (Total notional time: 140 hours)

ENGINEERING GRAPHICS (EGE105B, EGR115C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Mechanical and Mechatronic Engineering)

Introduction to graphics communication. Dimensioning and tolerance practices. Geometrical construction. Orthographic projections. Machine drawing and introduction to computer-aided design and assemblies. (Total notional time: 140 hours)

ENGINEERING GRAPHICS (EGC105B, EGC105C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Civil Engineering)

Drawing apparatus, drawing basics, construction geometry, orthographic projection, sections, isometric projection, CAD fundamentals and application of CAD to building drawings. (Total notional time: 140 hours)

ENGINEERING GRAPHICS (EGH105B) **CONTINUOUS ASSESSMENT**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Introduction to graphics communication. Dimensioning and tolerance practices. Geometrical construction. Pictorial projections. Interpenetration and development. Machine drawings. Civil drawings including electrical diagrams. (Total notional time: 140 hours)

ENGINEERING MANAGEMENT (EGT117V) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Engineering Contract And Law; Operations Management; Maintenance Management; Marketing And Diffusion Of Innovation; The Engineer, User Of Information And Communication Systems; Principles Of Project Management; Introduction To Accounting, Economics, Financial Management And Budgeting; Cost Estimating, Cost Engineering And Cost Management; Time Value Of Money And Project Selection; Business And Technology Strategy; Managing Technology And Innovation; The Overview Of Environmental Management And Sustainable Developmental Concepts For Management Practices. (Total notional time: 140 hours)

ENGINEERING MANAGEMENT (EGT216D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

The Environment in which Technical People Work; Principles of General Management; Human Resource Management; The Impact of Employment Relations and Labour Legislation on an Organisation; Managing People and Teams; Total Quality Management; An Introduction to Safety Management; The Engineer, user of Information and Communication Systems; Entrepreneurship; Ethics for Engineering Professionals. (Total notional time: 120 hours)

ENGINEERING MATERIALS (EMT206B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to equip the student with a fundamental understanding of how Engineering Materials are Processed and utilised in design problems. The module will give an overview of the fundamentals of engineering materials, processing techniques, properties and how each process interrelates with the other phases of manufacturing processes. (Total notional time: 140 hours)

ENGINEERING MATHEMATICS IA (EM115AB) **1 X 2-HOUR PAPERS**

(Module custodian: Department of Mathematics and Statistics)

Real valued Functions, Limits and continuity, Complex numbers, Vectors, Matrices, Vector spaces. (Total notional time: 140 hours)

ENGINEERING MATHEMATICS IB (EM115BB) **1 X 2-HOUR PAPERS**

(Module custodian: Department of Mathematics and Statistics)

Differentiation, Applications of differentiation, Partial differentiation, Integration, Applications of integration. (Total notional time: 140 hours)

ENGINEERING MATHEMATICS II (EMA206B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mathematics and Statistics)

Mathematical modelling, first-order ordinary differential equations (ODEs), higher-order ODEs, Laplace transforms, systems of ODEs, numerical solutions of ODEs, Sturm-Liouville problems, and partial differential equations. (Total notional time: 140 hours)

ENGINEERING METALLURGY (EME118S) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Principles of physical metallurgy; Failure analysis; Metallurgical analysis; Mechanical metallurgy; Foundry technology; Corrosion; Welding processes and engineering; Design of welded structures; Fabrication engineering. (Total notional time: 150 hours)

ENGINEERING PHYSICS (EPH105C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Physics)

Basic mathematics and vectors. Measurements. Kinematics in 1 dimension. Forces and Newton's laws of motion. Work energy and power. Elasticity. Static and dynamic fluids. Temperature and heat. Wave properties. Reflection of light and mirrors; refraction of light and lenses and optical instruments. (Total notional time: 140 hours)

ENGINEERING PRACTICE (EEE317B, EHE317B, EML317B, ENI317B, ENP317B, EPR317B, EPT317B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Engineering Communication; Project Management; Management and Ethics; Contracts and Intellectual Property; Entrepreneurship, Quality Management, Introduction to Accounting, Economics, Financial Management and Budgeting, and Safety Management. (Total notional time: 140 hours)

ENGINEERING PROJECT MANAGEMENT (EPJ129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Fundamentals of Project Management, Project life cycle, Project organisations, Project success, Project Planning Introduction, Scheduling and Time Management, Project planning, Work breakdown structure, The critical path method, The precedence method, Presentation of the scheduled network, Analysing resources requirements, Progress monitoring and control, Software selection, Budget and Cost Management, Cost management, Estimating methods, Forecast final cost, Documentation of estimating procedures, Budgeting, Financial control, Change control, Cost reporting, Value management, Risk Management, Definition of 'risk', Establishing the context, Risk identification, Risk analysis, Risk assessment, Risk treatment, Monitoring and review, Quality Management, Quality and quality management basics, Quality assurance systems, ISO 9000:2005 Quality System guidelines, Project quality assurance, Integrated Time and Cost Management, Earned value analysis, EVM analysis illustrated, Computer based integrated time and cost control, Project Team and Resource Management, Management and leadership, Cultural influences on project management, Authority and power of the project manager, Required attributes of the project manager, Essential functions of project manager, Selection of the project manager, Contract Administration and Procurement, The Commonwealth legal system, Elements of contracts, Procurement strategy issues, Tendering procedures, Vitiating factors, Termination of contracts, Time for completion and extensions of time, Remedies for breach of contract, Liquidated damages for late completion, Penalties and bonuses. (Total notional time: 150 hours)

ENGINEERING SOFTWARE DESIGN A (ES216AB) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

This module focuses on C Programming, offering an in-depth exploration of the language. Starting with the basics of C programming, it covers key concepts such as data input/output, variable types, and control structures such as loops and conditional statements. The module delves into functions and random number generation, followed by a study of arrays, searching, and sorting algorithms. The module also includes more advanced topics, such as pointers and dynamic memory management, culminating in an introduction to static data structures, such as array-based stacks and queues. This module provides a solid foundation in C programming, which is essential for understanding computer science fundamentals and preparing for advanced software engineering studies. (Total notional time: 140 hours)

ENGINEERING SOFTWARE DESIGN B (ES216BB) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Electrical Engineering)
This module, focuses on C++ Programming, building upon the C programming foundations. It introduces C++ and its object-oriented features, followed by file-handling techniques. The module explores static and dynamic data structures, demonstrating their implementation in C++. The module introduces the core concepts of object-oriented programming and more advanced topics, including encapsulation, inheritance and exception handling. The module concludes with graphical user interface programming in C++, equipping students with comprehensive knowledge and practical skills in modern software development using C++. (Total notional time: 140 hours)

ENGINEERING SURVEYING (ESU105B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Geomatics)
Levelling. Survey drawing. Earthworks quantities. The South African coordinate system. The join calculation. The polar calculation. The techniques of using a Theodolite or total station for tachometry. Field observations for tachometry. Tachometry calculations. Planning a site survey. Field observations for a site survey. Survey drawing. Control surveying for Points of Intersections (PI's). Control surveying for horizontal curves. Control surveying for pegging of roads and pipelines. Control surveying for excavation and embankments and intersections. (Total notional time: 280 hours)

ENGINEERING SURVEYING I (ESR206B) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
Instrument errors and adjustments including personal errors; Curves; Traversing; Triangulation; Spatial data; Deformation of structures; and Precise Levelling. (Total notional time: 280 hours)

ENGINEERING SURVEYING II (ESR307B) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
Compute Geometric Designs for Horizontal curves. Compute Geometric Designs for Horizontal curves (Simple curve). Compute Geometric Designs for Horizontal curves (Compound curve). Compute Geometric Designs for Horizontal curves (Reverse curve). Compute Geometric Designs for Vertical curves. Compute Geometric Designs for Transition curve. Test personal errors and adjust/correct instrument errors. Precise levelling. Deformation measurements. Triangulation. Application and Problem-solving. Traversing. Bowditch Method, Tan Method. Scale and Swing Method. (Total notional time: 240 hours)

ENGINEERING SURVEYING FUNDAMENTALS (EGP105B) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
Surveying Principles. Testing and Adjustment of a levelling instrument, Levelling rise and fall, and Levelling Long Section (HI Method). Levelling Cross Section. South African Co-ordinate System. Joins and Polars. Distance Correction. Traverse. (Total notional time: 280 hours)

ENGINEERING SURVEYING FUNDAMENTALS I (EGP105D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
Surveying Principles, Testing and Adjustment of levelling instrument, Levelling rise and fall, Levelling Long Section (HI Method), Levelling Cross Section, South African Co-ordinate System, Joins and Polars, Distance Correction, Traverse. (Total notional time: 280 hours)

ENGINEERING SURVEYING FUNDAMENTALS II (EGP206D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
Instrument errors and adjustments including personal errors; Curves; Traversing; Triangulation; Spatial data; Deformation of structures; and Precise Levelling. (Total notional time: 240 hours)

ENGINEERING SURVEYING PROJECT (ESP317B/R) **PROJECT ASSESSMENT**
(Module custodian: Department of Geomatics)
Instrument errors and adjustments including personal errors; Curves; Traversing; Triangulation; Spatial data; Deformation of structures; and Precise Levelling. (Total notional time: 120 hours)

ENGINEERING WORK SYSTEMS FOR PROCESS PLANNING (EWP115C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Various planning methodologies, which are relevant to different processes and/or volume requirements are considered. Further work-study techniques relevant to planning are presented. A build-up on the knowledge accumulated in the module Facility Planning methodologies. The module orientates the student with the software utilised in the industry used for planning like SAP, CISPro. This module builds the knowledge of the student in production philosophies such as "Just in Time" and "Theory of Constraints". (Total notional time: 140 hours)

ENTREPRENEURSHIP (ETN116S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Civil Engineering)

Entrepreneurship and entrepreneurial characteristics; Steps to establish a business; Forms of business ventures; Funding options in business; and Business plans. (Total notional time: 50 hours)

ENVIRONMENTAL AND WASTE MANAGEMENT (EVW129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Introduction to environmental and waste management, Benefits of sound environmental and waste management, Commonly used methods of environmental management, Commonly used methods of waste management. (Total notional time: 150 hours)

ENVIRONMENTAL ENGINEERING AND PROCESS SAFETY (EES317B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Environmental laws related to air, water and solid wastes; Process safety; Air pollution control; Water and wastewater treatment; Solid waste management; and Waste minimisation. (Total notional time: 140 hours)

ENVIRONMENTAL SCIENCE (ESA109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

This module focuses on the relationship between sustainable design and construction processes. Within the context of current sustainability agenda, relevant built environment technologies and their links with environmental sciences are explored. The module includes the application and critical understanding of BIM working processes and the software involved in the delivery of a BIM project. (Total notional time: 270 hours)

ERGONOMICS (ERG316D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Identify and gain experience in the use of basic ergonomic concepts applicable to products and product design. Become aware of underlying principles/approaches and thinking in ergonomics. (Total notional time: 60 hours)

EXPERIENTIAL LEARNING (WEE316D) **WORK-INTEGRATED LEARNING**

(Module custodian: Department of Electrical Engineering)

Industry-related training, as determined by the industry and the University. (Total notional time: 600 hours)

EXTRACTIVE METALLURGY (EXM118S) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Review on mineral processing; Metallurgical thermodynamics; Applied concept of sampling; Ferrous and non-ferrous metallurgy; Extraction solution chemistry - mechanisms and processes; Auxiliary operations; Plant practice and material handling. (Total notional time: 150 hours)

F

FACILITIES MANAGEMENT (FAG108G, FCG108G) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Sciences)

The research and application of facilities management principles in practice. The management of facilities demands more than merely maintaining and servicing buildings. It is a management function providing support to corporate operations, enabling the organisation to better achieve its stated objectives. A strategically driven approach to facilities management will provide maximum corporate benefit, with outputs measured by quality of service and value for money rather than on cost alone. (Total notional time: 240 hours)

FINITE ELEMENT MODELLING (FEM118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

3D stress analysis; 3D heat transfer; An overview of dynamic analysis procedures; Non-linear problems; Damping; Natural frequency extraction, residual and rigid body modes; Complex eigenvalue extraction; and Coupled analysis. (Total notional time: 150 hours)

FIXED NETWORKS (FNE118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Computer networks and the internet; Application layer; Transport layer; The Network Layer; The Link layer - links, access networks, and LANs; Multimedia networking; and Security in computer networks. (Total notional time: 150 hours)

FLUID MECHANICS (FLM207B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to equip the student with a fundamental understanding of fluid statics and fluid dynamics principles and how to apply the same in solving practical problems in various aspects of fluid mechanics. (Total notional time: 280 hours)

FOUNDATION ARCHITECTURAL DESIGN I (ACDF05P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Introduction to Architectural Design processes and concepts, focusing on: (1) Principles of architectural design and the design process. (2) Planning principles and spatial relationships. (3) Ergonomic design principles. (4) The influence of structure and construction during design decision-making. (5) Design informants (including context, historical precedents and contemporary precedents). (6) Architectural theory and meaning. (7) Product design and manufacturing, and (8) Independent thinking and decision-making. (Total notional time: 240 hours)

FOUNDATION CONSTRUCTION I (CSTF05P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Fundamental Building Construction, focusing on: (1) A visual lexicon of the South African dwelling. (2) A single-storey building, specifically, the building site; Foundation, basement, floor, wall and roof systems; Building envelope; Construction materials, construction methods and detailing; Building services, fittings and finishes; and (3) Relevant SANS 10400 and other regulations, standards and codes. (Total notional time: 120 hours)

FOUNDATION ARCHITECTURAL LANGUAGE AND PRESENTATION TECHNIQUES I (ALPF05P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Introduction to Architectural Language and Presentation Techniques, focusing on: (1) Architectural presentation techniques including artistic media and model building. (2) Communicating design ideas and concepts using verbal presentation, public speaking and written communication; and (3) Formulating a normative position informing design decisions. (Total notional time: 120 hours)

FOUNDATION PROFESSIONAL PRACTICE I (PFRF25P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Introduction to Professional Architectural Practice, focusing on: (1) The structure and regulation of the architectural profession; and (2) Local Authority building plan submission requirements and approval processes. (Total notional time: 60 hours)

FOUNDATION TECHNICAL ARCHITECTURAL DRAWING I (FDTF25P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Introduction to Technical Architectural Drawing, focusing on: (1) Drawing by hand; and (2) Drawing by computer using related software and hardware to present design projects. (Total notional time: 60 hours)

FREEHAND DRAWING (FHE105D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Basic freehand perspective line drawing skills for designing products; how to use freehand drawing efficiently to develop, communicate and record design. (Total notional time: 200 hours)

FUEL TECHNOLOGY (FUE317B) **1 X 3-HOUR PAPER**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Coal Technology (solid fossil fuel); Petroleum and gas technology (liquid fossil fuel and gas); Combustion technology; Fuel cells and hydrogen technology; Nuclear technology; and Renewable energy technology. (Total notional time: 140 hours)

G

GENERAL PHYSICS (GPS115B) **1 X 3-HOUR PAPER**

(Module custodian: Physics)

Motion along a straight line: displacement, velocity, acceleration. Projectile motion in two dimensions and three dimensions. Force and Newton's Laws, friction, circular motion. Impulse and momentum, elastic and inelastic collisions. Rotation, kinetic energy, torque. Temperature, heat and first law of thermodynamics. Oscillations and waves. (Total notional time: 140 hours)

GEODESY AND MAP PROJECTION I (GOP115B) **1 X 3-HOUR PAPER**
GEODESY AND MAP PROJECTIONS (GOP115D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Geographical Coordinates. Spherical trigonometry. Shape of the Earth. Geoid. Mathematical representations of the Earth - (including datums and reference ellipsoids). Map projections. Including mathematical models and projection characteristics). Two- and three-dimensional coordinate systems. SA Survey coordinate system and UTM system. Re-projections. transformations. (Total notional time: 120 hours)

GEODESY AND MAP PROJECTIONS II (GOP317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Spherical Astronomy. Two-dimensional coordinate transformation. Coordinate systems and three-dimesional rotations. Terrestrial versus geodetic coordinate systems. Geodetic principles. Principles of GPS. Gravimetry and gravity field of the earth. (Total notional time: 180 hours)

GEOGRAPHIC INFORMATION SCIENCES (GIF117V) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Geomatics)

The purpose of this module is to equip students with advanced GIS (Geographical Information Systems) cognitive, conceptual, and practical skills that is needed for Geomatics Technologists. This module will introduce students to GIS Programming, GIS Data Sharing and Web Mapping, which are crucial in geospatial data management and data visualisation (geospatial data science and machine learning. (Total notional time: 120 hours)

GEOGRAPHIC INFORMATION SYSTEMS (GIT206D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Maps; Map Designing; Cartometry; GIS Concepts and Components; GIS Data Collection; GIS Database/ Geo-Database; GIS Analysis and Modelling; GIS Applications; Visualisation and representation of geo-spatial information. (Total notional time: 240 hours)

GEOGRAPHIC INFORMATION TECHNOLOGY I (GIT206B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Maps and Map Design. Cartometry. GIS Concepts. GIS Data Collection. GIS Database/Geodatabase. Fundamentals of Spatial Analysis. GIS Applications. Visualisation and representation of geo-spatial information. (Total notional time: 240 hours)

GEOGRAPHIC INFORMATION TECHNOLOGY II (GIT317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Programming for Spatial Data Processing. UML for GIS Applications. Distributed Systems. Advanced Spatial Analysis. (Total notional time: 120 hours)

GEOGRAPHY (GEG115B, GEG115D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Physical Geography. Human Geography. Disaster Management and Climate Change. Tourism. Understanding Maps. (Total notional time: 60 hours)

GEOMATICS COMPUTER APPLICATIONS (GOA105B, GOA105D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
Computer Hardware. Software. Introduction to Microsoft Office Suite. Data Communication. Virus and Anti-virus. Internet Applications. Microsoft Excel for Surveying Computations. Design of web applications. Flow-charts of Algorithms. Programming for Geomatics Problem-Solving. Databases. Entity Relationship Modelling. Microsoft Access for Database Design. SURPAC for Surveying Computations. (Total notional time: 190 hours)

GEOMATICS CONTROL PROJECT (GCP206D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
The purpose of this module is to provide the student with skills in engineering surveying using a project-based approach. This module enables students to work on a survey project as they would in the industry, thus preparing them for application in the workplace. This module provides in depth practice of theories learnt and application of geomatics technologies. (Total notional time: 120 hours)

GEOMATICS DATA SCIENCE AND TECHNOLOGY (GDS118G) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
This module equips students the with Geomatics Data Science and Technology skills and give them the introductory knowledge, cognitive and conceptual and practical skills. The module provides the students with an essential understanding within the geomatics context of data science, artificial intelligence, machine learning, big data, data mining, data visualisation and cloud computing. (Total notional time: 120 hours)

GEOMATICS LAW AND ENTREPRENEURSHIP (GLE118G) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
This module equips students with knowledge in land rights, land tenure concepts, cadastral surveys, laws applicable to and related to geomatics. Importantly, entrepreneurship and business planning are taught. Professionalism, ethics, professional communication, and etiquette are included in this module as it is essential. (Total notional time: 120 hours)

GEOMATICS PRACTICE MANAGEMENT AND ETHICS (GPM117V) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
The purpose of this module is to provide students with an understanding of practice management, professionalism, professional ethics, and related legislation. Professional practice and partnerships are reviewed. Management leadership is explored. Information and its dissemination are essential and therefore information economics is investigated. Geomatics Entrepreneurship and financial management are included in this module. (Total notional time: 120 hours)

GEOMATICS PROJECT ENGINEERING SURVEYING (GPE118G, GPE118R) **PROJECT ASSESSMENT**
(Module custodian: Department of Geomatics)
This module enables students to solve complex real-world geomatics problems, demonstrate project report writing skills, apply entrepreneurial skills, and apply theoretical knowledge, modelling, and research. (Total notional time: 300 hours)

GEOMATICS TECHNOLOGY (GTH117V) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
Different geomatics-related technologies are used in the acquisition, processing, and visualisation of spatial data. The core of this module is on the fourth Industrial Revolution and the enabling technologies it provides to Geomaticians to execute different kinds of surveys and associated problem-solving. The technologies explored include GNSS, Radar and Lidar amongst others. The module also looks at emerging trends such as the fifth Industrial Revolution and machine learning. Students are introduced to programming using high-level languages. (Total notional time: 120 hours)

GEOMETRIC DESIGN (GDE117V) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Geomatics)
The purpose of this module is to provide students with the knowledge, cognitive and conceptual tools in Geometric Design (elements and principles of road design, road ecology, curve design, intersection and interchange design, earthworks, and drainage design). This course will give an overview of the theoretical concepts and practice in the fundamentals of geometric design by providing a link to its relevance and application in technology. (Total notional time: 120 hours)

GEOTECHNICAL ENGINEERING: GEOMECHANICS (GT216CB) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
This module is designed to equip students with a solid grasp of the fundamental aspects of soil science, geology, and soil mechanics necessary for building durable infrastructure like roads and foundations. Throughout the module, students will delve into geotechnical site investigation, sieve analysis and hydrometer, plasticity, and structure of soils, soil compaction, and In-situ stresses. After completion, students will understand soil mechanics, enabling them to solve real-world challenges in geomechanics. (Total notional time: 140 hours)

GEOTECHNICAL ENGINEERING: GEOTECHNICAL ENGINEERING (GT216DB) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
This module covers the core principles behind soil mechanics and principles. The module also covers essential topics such as permeability, soil stresses, compressibility, and shear strength. Additionally, the module will examine design concepts such as lateral earth pressure, slope stability, soil-bearing capacity, and an introduction to geosynthetics. After completion, students can design and solve real-world solutions in Geotechnical Engineering. (Total notional time: 140 hours)

GEOTECHNICAL ENGINEERING IV (GTE118S) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
This module covers a wide field of geotechnical engineering principles and practices. The course focuses on the challenges of problematic soils when designing foundations, offering various design alternatives and ensuring structural stability. The module covers the detailed study of pile foundation design, the designing of raft foundations, and the principles behind braced cuts, ensuring that students understand geotechnical engineering solutions for diverse soil-related challenges in construction and infrastructure projects. (Total notional time: 100 hours)

GREEN ENERGY SYSTEMS (GES216B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Electrical Engineering)
Fundamentals on Energy Conversion; Solar (Photovoltaic) Energy Conversion; Hydro Power Conversion; Wind Energy Conversion Systems; Energy Storage. (Total notional time: 140 hours)

H

HEAT AND MASS TRANSFER PROCESSES (HMT216B) **1 X 3-HOUR PAPER**
(Module custodian: Chemical, Metallurgical and Materials Engineering)
Fundamentals of heat transfer; Steady state one dimensional and multiple dimensions conduction; Condensation and boiling heat transfer; and Mass transfer. (Total notional time: 140 hours)

HEAT TRANSFER (HTR317B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
A comprehensive introduction to the rates of thermal energy systems for students in mechanical engineering. The module is designed to give students a necessary foundation for a comprehensive understanding of rate of transfer of thermal energy in energy systems. (Total notional time: 140 hours)

HISTORY OF ART AND DESIGN (HTA105D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
A general outline of the history of design and trade from the pre-historic late Stone Age until the Industrial Revolution indicating broad developmental patterns. (Total notional time: 200 hours)

HISTORY OF INDUSTRIAL DESIGN (HOI205D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
A general outline of the history of industrial design through the Industrial Revolution and modern art movements. (Total notional time: 160 hours)

HYDROMETALLURGY (HYM216B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Chemical, Metallurgical and Material Engineering)
Introduction of information literacy. Development of a search strategy and application of a search string to search engines and academic databases. Evaluation of information sources. Ethical and legal use of information. (Total notional time: 140 hours)

I

INDUSTRIAL AUTOMATION (IAU117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Data Communication; Networking; Networks in Automated Systems; Fieldbuses in Automated Systems; Wireless Fieldbuses in Industrial Automation; Intrinsically Safe Fieldbus Systems; Commissioning and Installation Practices on Automated Fieldbus Systems. (Total notional time: 140 hours)

INDUSTRIAL DATA COMMUNICATION (IDC317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

The purpose of this module is to develop the necessary knowledge, understanding and skills required for the student's further progress towards becoming a competent mechatronics engineering technician. The module will enable the student to build, operate, diagnose and maintain networks and communications equipment. (Total notional time: 140 hours)

INDUSTRIAL DESIGN (IND116S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Design thinking (Design, make, test, refine); Business model canvas; and Costing and break-even graphs; and Spin outs and licensing. (Total notional time: 50 hours)

INDUSTRIAL DESIGN I (ITD105D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

This module provides a foothold into what needs to be considered when designing products (factors of design) and how to go about designing products. The module develops basic workshop and model-making skills and provides a variety of hands-on design experiences of the important, common, workshop-based materials and processes for product and model making. (Total notional time: 320 hours)

INDUSTRIAL DESIGN II (ITD206D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Broadens design experiences required for mass-produced products. Use of materials. Manufacturing processes, business constraints and electronic design applications are developed. Interaction with industry is encouraged. (Total notional time: 400 hours)

INDUSTRIAL DESIGN III (ITD306D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Extends and refines applied design skills, knowledge and practice as required for entry-level Industrial Design service. Comprehensive theoretical defence of design decisions is expected. Other modules in the same year level are integrated into Industrial Design III projects. (Total notional time: 420 hours)

INDUSTRIAL DESIGN PROJECTS (IDP307B) **PROJECT ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Integration of theoretical concepts gained in various disciplines into a project that will solve a problem, guide on how to apply industrial engineering inputs in any design project and encourage the development of team spirit necessary to be attained in preparation for the world of work. (Total notional time: 280 hours)

INDUSTRIAL ENGINEERING PRACTICE (IEP105C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

This module provides an understanding and hands-on experience that will introduce the candidate to skills as an Industrial Engineer Technician Assistant. Teaching focuses on the integration of the engineering work systems for process planning, the process improvement and the engineering science in the daily work of an Industrial Engineer Technician Assistant. (Total notional time: 280 hours)

INDUSTRIAL PROJECT (IEE107V, IEE117R) **PROJECT ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

The module covers the fundamentals of project management, planning and control techniques. Students will acquire the competency and knowledge needed to calculate and process all project management planning and control. The module is an introduction to project management that covers standards and project processes, feasibility study, execution, monitoring and control, communications and the managing of small projects. The module also includes a project aiming to solve a real-world industrial problem by the design, test and implementation of the project. (Total notional time: 280 hours)

INDUSTRIAL WORK SYSTEMS (IWS105B) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
Productivity. Problem-solving and operation analysis tools. Method Study. Work measurement. Compensation. Facilities design. Assembly Lines. Material Handling. Storage and warehousing. Computers in facilities design. Legislation. (Total notional time: 240 hours)

INFORMATION LITERACY (INL125C) **CONTINUOUS ASSESSMENT**
(Module custodian: Directorate of Library and Information Services)
Introduction of information literacy. Development of a search strategy and application of a search string to search engines and academic databases. Evaluation of information sources. Ethical and legal use of information. (Total notional time: 10 hours)

INTEGRATED CIVIL ENGINEERING DESIGN PROJECT (CDP307B) **PROJECT ASSESSMENT**
(Module custodian: Department of Civil Engineering)
On completion of this module, a student will be able to demonstrate competence in the following Graduate Attributes via real-world scenarios: Problem-solving, application of scientific and engineering knowledge, engineering design and investigations, experiments and data analysis engineering methods, skills, tools, including information technology, professional and technical communication, sustainability and impact of engineering activity, individual, team and multidisciplinary working, independent learning and engineering professionalism. (Total notional time: 280 hours)

INTELLECTUAL PROPERTY (ITR116S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
Disclosure analysis; Novelty assessment; IP forms; Methods of protecting IP; IP laws/legislations; Patent protection strategies; and Commercialisation of IP (route to market). (Total notional time: 50 hours)

INTERNATIONAL BUSINESS COMMUNICATION (IBO116S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Applied Languages)
Introduction to the language of choice (culture, sounds, syllables and words); Introducing oneself; Formation of simple sentences; Greeting/address forms (work/industry); and Business protocol in the chosen language (organogram). (Total notional time: 50 hours)

INTRODUCTION TO COMMERCIAL LAW (ICL215D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Building Science)
The South African Legal System, including reference to courts, sources of law, a description of the main divisions of law and officers of the courts, Contract Law: consensus, Contract of Sale, Contract of Lease, Contract of Insurance, Contract of Agency. Understanding the basic principles of construction law in the Built Environment. (Total notional time: 100 hours)

INTRODUCTION TO ECONOMICS IA (MICRO) (IMR115D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Economics)
Demonstration of the basic questions economics attempts to address and highlights all about in the field of economics, Graphs in economics, economic problem, the basic theory of demand and supply, elasticity, production and organisation, consumer theory, choice and preferences, firms output and costs and perfect competitive markets. (Total notional time: 100 hours)

INTRODUCTION TO ECONOMICS IB (MACRO) (IMR215D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Economics)
Measuring GDP and economic growth, economic growth, monitoring jobs and inflation, inflation, unemployment and the business cycle, money, the price level and inflation, the exchange rates and the balance of payments, fiscal policy and monetary policy. (Total notional time: 100 hours)

INTRODUCTION TO ROBOTICS (IRO118S) **2 X 2-HOUR PAPER**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
An introduction to mobile robotics; An introduction to industrial robots; Robot operating system; Robots and vision; and Introduction to artificial intelligence and robots. (Total notional time: 200 hours)

INVESTIGATIVE PROJECT (IPJ307B/IPJ317R) **PROJECT ASSESSMENT**

(Module custodian: Chemical, Metallurgical and Materials Engineering)

Chemical engineering research; Research Proposal; Formulate the project (proposal), Describe and justify the theoretical framework and methodology to address the project, introduction, abstract, main body, conclusion and recommendations, tables figures, graphs, illustrations, references, appendices, writing the first draft, revising the first, content and structure, scientific and technical prose, Conducting and managing project; Data Analysis, statistical analysis of data and display; Software support for various writing and graphic tasks; Use of Microsoft PowerPoint; and poster and feasibility report; Technical report writing (Final report); analyse the information gained/result of the project, draw conclusion / make recommendations based on the project, produce a report of the completed work; Project communication, audiences, scientific and technical prose, short talks and poster; and Investigative research. (Total notional time: 280 hours)

IRON AND STEEL MAKING (ISM317B) **1 X 3-HOUR PAPER**

(Module custodian: Directorate of Chemical, Metallurgical and Material Engineering)

Blast Furnace Thermodynamics; Alternative Iron Making Processes; Steelmaking Processes; Gases in Iron and Steel; Ladle Metallurgy and continuous casting; Project Iron and Steelmaking. (Total notional time: 140 hours)

L

LAND MANAGEMENT AND SPATIAL PLANNING (LMS118G) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Geomatics)

This module equips students with content on urban design such as zoning, integrated development planning, city models and smart cities with supporting legislation. The land development process is detailed with a focus on both town planning and engineering surveying. This module will also include urban and rural management, and spatial dynamics. Related legislation with an introduction to urban spaces and integrated environmental management combined with land management practice, land administration, valuation and economics. (Total notional time: 120 hours)

LIFE CYCLE MANAGEMENT (LCN129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Introduction to Life-Cycle Management, Engineering design decisions, Quantitative and Qualitative methods Supporting Life Cycle Assessment, Life Cycle Assessment models, Productivity oriented method for sustainability analysis, Environmental valuation of life cycle assessment and Economic Input Output Life Cycle Assessment Model, Life Cycle Costing (LCC). (Total notional time: 150 hours)

LIFE SKILLS (LFS125X) **CONTINUOUS ASSESSMENT**

(Module custodian: Directorate of Student Development and Support)

Personal, socio-emotional and academic skills development for students in higher education. This module includes: 1. Intra- and interpersonal skills (e.g. emotional intelligence, relationships, and conflict management); 2. General study skills (e.g. time management, goal setting, learning styles); 3. Health and wellness (e.g. HIV/AIDS, GBV issues, substance abuse); 4. Student life and adjustment (e.g. identity development, adjusting to a higher education environment); and 5. Financial management. (Total notional time: 20 hours)

LINEAR SYSTEM MODELLING (LSM216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to develop the necessary knowledge, understanding and skills required for the student's further progress towards becoming a competent mechatronics engineer. The module will enable the student to model, operate, and diagnose. (Total notional time: 140 hours)

M

MACHINES AND DRIVES (MDR216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

Electric machines have a ubiquitous presence in our modern daily lives, from the generators that supply electricity to motors of all sizes that power countless applications. Providing a balanced treatment, the module takes a ground-up approach that emphasises fundamental principles. The module carefully deploys physical insight, mathematical rigor, and computer simulation to clearly and effectively present electric machines and drive systems. (Total notional time: 140 hours)

MAN-MACHINE INTERFACE (MMF117V) **1 X 2-HOUR PAPER**
(Module custodian: Department of Electrical Engineering)
Introduction; Arduino Studio IDE; HTML, CSS, XML, Java-script; Analog and Digital interfacing; Digital control; Data representation; User interface design (UID). (Total notional time: 70 hours)

MANUFACTURING AND TOOLING (MTO115C) **1 X 3-HOUR PAPER**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
The purpose of this module is to equip the student with a fundamental understanding of mechanical manufacturing materials and processes and how to apply these to a design problem. (Total notional time: 140 hours)

MANUFACTURING I (MAN115B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
The purpose of this module is to equip the student with a fundamental understanding of mechanical manufacturing materials and processes and how to apply these to a design problem. (Total notional time: 140 hours)

MANUFACTURING I (MUR115D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Train students in the safe operating procedures of workshop machinery and selected hand tools. Following the presentation of dimensioned engineering drawings, students will receive additional instruction in the production of workpieces from metals, natural fibres, ceramics and plastics. (Total notional time: 80 hours)

MANUFACTURING II (MAN317B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
The purpose of this module is to develop a broad-based knowledge and understanding of the student in the field of Tooling. (Total notional time: 140 hours)

MANUFACTURING II (MUR216D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Knowledge of various manufacturing processes, theory and applications. Material selection including surface treatments, measurement and conformity to specification. (Total notional time: 80 hours)

MANUFACTURING III (MUR316D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Apply suitable manufacturing methods required in the projects in the Industrial Design III module. (Total notional time: 80 hours)

METALLURGICAL PROCESSES AND PLANT DESIGN (MPG118S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Chemical, Metallurgical and Material Engineering)
Analysis of design problems; Design and operations of plants; Economic and environmental considerations; Furnaces and fuels; and Nuclear reactor materials. (Total notional time: 150 hours)

MATERIAL SCIENCE (MSC115B) **1 X 3-HOUR PAPER**
(Module custodian: Chemical, Metallurgical and Materials Engineering)
Introduction to materials science and engineering; Atomic structure and interatomic bonding; Crystalline solids: structure and Imperfections; Mechanical properties and failure; Processing and applications of metals; ceramics: structure, properties, processing and applications; Polymer material science; and Composites and Advanced materials. (Total notional time: 140 hours)

MATERIAL TECHNOLOGY I (MIY205D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Using Computer-Aided Design (CAD) software this module deals specifically with the application and visualisation of materials and processing methods as a component of projects in the Industrial Design II module. (Total notional time: 120 hours)

MATERIAL TECHNOLOGY II (MIY306D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Students should be able to analyse the performance requirements of products and be capable of providing feasible production strategies that include material selection, production and assembly methods with an appreciation for constraints such as economic viability and projected production volumes. (Total notional time: 120 hours)

MATERIALS PROCESSES AND TECHNOLOGY (MPT118S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
Requirements for choice of engineering materials processes; Fundamentals of engineering materials processes; Engineering materials primary processes; Engineering materials secondary and tertiary processes; and Engineering materials processes design project. (Total notional time: 150 hours)

MATERIALS PROPERTIES AND MANUFACTURING (MPU118S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
Introduction, correlation between process, property and performance of engineering materials; Corrosion; Creep; Fatigue; Fracture; and Case study - Manufacturing Project. (Total notional time: 150 hours)

MATHEMATICS (MAT117V) **1 X 3-HOUR PAPER**
(Module custodian: Department of Mathematics and Statistics)
Bridging mathematics; Matrix analysis; Z transforms; Fourier analysis; Second-order partial differential equations. (Total notional time: 140 hours)

MATHEMATICS IA (MHA115D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Mathematics and Statistics)
The module is a basic introduction to calculus, as well as cognitive and conceptual tools, for implementation in other modules in the qualification and the workplace. The focus will be on basic applications in engineering. (Total notional time: 120 hours)

MATHEMATICS IB (MHB115D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Mathematics and Statistics)
This module provides the background in calculus, differential equations and numerical methods. (Total notional time: 120 hours)

MATHEMATICS II (MAT216D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Mathematics and Statistics)
First-order differential equations. Higher-order differential equations. Basic mathematical modelling. Laplace transforms. Systems of differential equations. Numerical solutions of differential equations. Fourier Series. (Total notional time: 120 hours)

MECHANICAL DESIGN PROJECTS (MEP307B) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
The purpose of this module is to develop the advanced knowledge and understanding of the student in the process of problem assessment and design. (Total notional time: 280 hours)

MECHANICAL ENGINEERING DRAWING (MDG115D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Introduction to component engineering drawing focused on Industrial Design requirements. Datum-based dimensioning of component and assembly drawings that identify manufacturing material and process. Using Computer-Aided Design (CAD) software as a basis, students develop their ability to create and layout engineering drawings, identifying datum construction and dimensioning techniques. (Total notional time: 80 hours)

MECHANICAL MAINTENANCE ENGINEERING (MHM118S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
Introduction to Maintenance Engineering; Maintenance Management and Control; Maintenance Costing; Design Considerations for Maintenance; and Maintenance Management Systems. (Total notional time: 150 hours)

MECHANICS (1EM105B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
Introduction and SI units. Kinematics. Force's and Newton's laws of motion. Dynamics of uniform circular motion. Work and Energy. Impulse and momentum and rotational dynamics and torque. (Total notional time: 100 hours)

MECHANICS (MEC115D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of the module is to equip students with a clear and logical understanding of concepts of physics and engineering mechanics. On successful completion of this module, students will develop knowledge and skills regarding many topics such as force systems and equilibrium into two dimensions, structures analysis, centroid, area moments of inertia and friction. (Total notional time: 120 hours)

MECHANICS (MEC115C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to equip the student with a clear and logical understanding of the basic concept and principles of physics and mechanics to strengthen an understanding of the concepts and principles through a broad range of interesting applications to the real-world. (Total notional time: 140 hours)

MECHANICS (MEC105B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of the module is to develop students' understanding of Engineering Mechanics. On successful completion of this module, students will acquire knowledge and skills regarding many topics such as force systems and equilibrium into two and three dimensions, structures analysis, distributed forces, area moments of inertia, friction and kinetics of particles: force, mass, acceleration, work, energy, impulse and momentum. (Total notional time: 280 hours)

MECHANICS (SEM105B, MEC115B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

The purpose of this module is to develop an understanding of the field of engineering statics and mechanics within the civil engineering context. The main topics include: introduction to statics, force systems, equilibrium, structures and distributed forces. (Total notional time: 100 hours)

MECHANICS: ELECTROTECHNOLOGY (ME115DB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Basic Electrical Technology (DC). Electrical Circuits (DC). Electrostatics (DC). Magnetism and electromagnetism. Alternating Current Theory. Alternating Current Circuits. Electrical System Networks. (Total notional time: 140 hours)

MECHANICS: MECHANICS (ME115CB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of the module is to equip students with a clear and logical understanding of concepts of physics and engineering mechanics. On successful completion of this module, students will develop knowledge and skills regarding many topics such as force systems and equilibrium into two dimensions, structures analysis, centroid, area moments of inertia and friction. (Total notional time: 140 hours)

MECHATRONICS (MCH115C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to introduce to the students the basic concepts of Mechatronics – the application of computers, digital technology and Mechanical machines in the modern environment. (Total notional time: 140 hours)

MECHATRONICS DESIGN PROJECTS (MED307B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to develop the advanced knowledge and understanding of the student in the process of problem assessment and design. (Total notional time: 280 hours)

METALLURGICAL CHEMISTRY (MCY115B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Introduction to Analytical Metallurgy; Introduction to Metallurgical Chemistry; Fundamentals of Metallurgical Chemistry; Introduction to Thermochemistry and Metallurgical Equilibria; and Electrochemistry. (Total notional time: 140 hours)

METALLURGICAL MATERIALS (MMA115B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Chemical, Metallurgical and Material Engineering)
Atomic Bonding and Crystal Structure of Engineering Materials; Physical and Chemical Properties of Engineering Materials; Mechanical Properties and Behaviours of Materials; Applications and Processing of Metal Alloys; Introduction to the Chemistry and Prevention of Corrosion; Polymers and their Properties, and Glass and Ceramic Materials. (Total notional time: 140 hours)

MINERAL PROCESSING (MIP206B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Chemical, Metallurgical and Material Engineering)
Fundamentals of metallurgical principles; Fundamentals of Mineral Processing; Size Reduction; Classification; Concentration Techniques; and Dewatering Techniques. (Total notional time: 280 hours)

METALLURGICAL THERMODYNAMICS (MTY115B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Chemical, Metallurgical and Materials Engineering)
Introduction to thermodynamics; The first law of thermodynamics; The second law of thermodynamics; Solutions and reactions involving gases with Gibbs free energy composition in phase diagrams; and Introduction to metallurgical kinetics. (Total notional time: 140 hours)

MOBILE APPLICATIONS DEVELOPMENT (MAD115C) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Electrical Engineering)
Introduction to software proposal documentation, web programming principles and development, fundamentals of API and database development, industry-standard software solutions, rapid development using LLMs (Artificial Intelligence), technology integration and prototype deployment. (Total notional time: 140 hours)

MODERN AND INDUSTRIAL CONTROL (MIL118S) **2 X 2-HOUR PAPER**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
An overview of modern and industrial control systems and techniques; Advanced system identification and statistical modelling; Advanced state space controllers and state estimators; Predictive-based control; Embedded control of real-world systems with case studies. (Total notional time: 200 hours)

MULTIMEDIA PRESENTATION (MUO306D) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Project application of the spectrum of contemporary design media skills used for effective and unhindered design development and communication. (Total notional time: 200 hours)

N

NETWORK SYSTEMS V (NSY109M) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
Current and emerging networking hardware basics and terminology. Operating system set-up for networking. Data security and maintaining networks. Basic network-related software support skills. (Total notional time: 40 hours)

NETWORK TECHNOLOGY (NTN115C) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Electrical Engineering)
This module provides a solid foundation in network technology with an emphasis on practical hands-on experience based on the following: Introduction to Networking; Network Devices and Software; IP Addressing and Subnetting; LAN Switching and WAN Technologies; Wireless Networks; Industrial Data Networks; Network Troubleshooting and Management. (Total notional time: 140 hours)

NON-FERROUS METALLURGY (NFM317B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Chemical, Metallurgical and Material Engineering)
Introduction to Hydrometallurgy; Separation, purification and enrichment processes of leach solution; Precipitation process for metal recovery from solution; Electrolytic processes from recovery and purification of metals. (Total notional time: 140 hours)

O

OPERATIONS MANAGEMENT (OMG118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Introduction to operations management and strategy; The design of products and services; The design of service delivery systems; The design of manufacturing processes; Supply network design; Enterprise Resource Planning (ERP); and Operations improvement. (Total notional time: 150 hours)

OPERATIONAL RESEARCH (OPR216B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Fundamentals of decision theory. Decision trees. Linear programming: graphic methods. Linear programming: the simplex method. Linear programming: sensitivity analysis, duality. Linear programming: applications. Transportation and assignment methods. Integer programming, goal programming and the branch and bound method. Waiting Lines. Introduction to project management using PERT diagram. Simulation modeling. Markov analysis. (Total notional time: 140 hours)

OPERATIONAL RESEARCH (OPR129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Revision of Linear Programming Concepts and Applications, Goal Programming Concepts and Applications, Integer Programming Concepts and Applications, Deterministic and Probabilistic Dynamic Programming, Deterministic and Probabilistic Inventory Models, Non-linear Programming, Monte Carlo Simulation. (Total notional time: 150 hours)

OPTIMISATION THEORY (OTY118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Convexity; Optimality conditions; Nonlinear programming; Linear programming and duality; Quadratic programming; and Mixed integer programming. (Total notional time: 150 hours)

ORGANIC CHEMISTRY (ORC115B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Introduction to organic chemistry, organic molecules, classes, nomenclature, structures, bonding, electronegativity and simple reactions; mechanisms of reactions of organic compounds, resonance, specific functional groups of interest include alkanes, alkenes, and their cyclic analogues; aromatic compounds; alcohols, ether and their sulphur analogues; aldehydes and ketones, carboxylic acids and their derivatives. Selected reactions and mechanisms of the specific functional groups include nucleophilic and/or electrophilic additions, substitutions and elimination processes. (Total notional time: 140 hours)

ORGANIC CHEMISTRY (ORH115B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Introduction to organic chemistry, organic molecules, classes, nomenclature, structures, bonding and simple reactions; mechanisms of reactions of organic compounds - stereochemistry, resonance, nucleophilic additions and substitutions, elimination reactions; hydroxyl 1 group - alcohol and phenols, carbonyl group - aldehydes and ketones structure, carboxylic acid derivatives - anhydrides acid halides esters and amide, amino group - amines, structure; fats and oils, amino acids, proteins, carbohydrates, natural products; chromatography - principles and methods with special emphasis on planar chromatography; liquid extraction and solid phase extraction, comparison of traditional and modern extraction procedures; and Introduction to electro-analytical methods. (Total notional time: 140 hours)

ORGANISATIONAL BEHAVIOUR (ORB129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Fundamentals of Human Resource Management, Introduction to human resource management strategy, Productivity, Key success factors and measures, Human resource development and training, Performance management, Creating a strategic organisation, Creating a learning organisation, Strategic industrial relations management, Implementation of strategies, Adjusting the organisation to change, Policy Integration and Human Resources, Environmental issues, Affirmative action and socio-economic development, OHS Act, Knowledge Management. (Total notional time: 150 hours)

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PARTICLE TECHNOLOGY (PRY317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Materials Engineering)

Particle size analysis; Size reduction, Flow past immersed bodies; Mechanical-physical separation process; drying; and Membrane separation processes. (Total notional time: 140 hours)

PHOTOGRAMMETRY I (APG206B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Aerial Imaging principles (image types, photogrammetry cameras, scanners and workstations); Flight planning, drone surveys and laser scanning technologies, close range imaging; Relative and absolute orientations principles, image resection, bundle adjustment; Rectification of aerial photographs, surface interpolation techniques; camera calibration methods; Homogeneous coordinates and vanishing points in Photogrammetry. (Total notional time: 240 hours)

PHOTOGRAMMETRY II (APG317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

Mathematical concepts in photogrammetry, aero triangulation. Photogrammetric Resection, Intersection and Triangulation. The Least Squares adjustment. Collinearity condition. Coordinate Transformations. Aero Triangulation, 3D modelling, Point cloud processing, scripting for photogrammetry. (Total notional time: 120 hours)

PHOTOVOLTAIC INSTALLATIONS (PVI115C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Introduction to Solar PV systems design and installation according to SANS standards. Wire sizing, equipment specifications, commissioning and other necessary steps in the design and installation phases of residential and commercial systems. (Total notional time: 140 hours)

PHYSICAL ASSET MANAGEMENT (PAM129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

The fundamentals of Asset Management, Introduction to Asset Life-cycle Management, Engineering design decisions, Quantitative and Qualitative methods Supporting Life Cycle Assessment, Understanding ISO 55001 and ISO 14040 STANDARDS, Maintenance Management (Total notional time: 150 hours)

PHYSICAL CHEMISTRY (PHC115B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Materials Engineering)

Chemical equations, stoichiometry, acids and bases; Chemical kinetics, equilibrium and aqueous solutions; Kinetic-molecular theory of gases; Thermochemistry: properties of the Gibbs functions; chemical potential; fugacity; changes of state; Equilibria: chemical and electrochemical; Quantum mechanics; Basic principles of photochemistry; and kinetics of photochemical processes. (Total notional time: 140 hours)

PHYSICAL METALLURGY (PHM206B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Introduction to Project Metallurgy; Project Communication; Research Project Design; Materials Testing and Analysis; and Technical report writing. (Total notional time: 280 hours)

PHYSICS (SEP115B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Physics)

Vectors and calculus for physics. Kinematics in 1 dimension. Forces and Newton's laws of motion. Work energy and power. Elasticity. Static and dynamic fluids. Temperature, heat and thermodynamics. Wave properties and electromagnetic waves. Reflection of light and mirrors; refraction of light lenses and optical instruments. (Total notional time: 100 hours)

PHYSICS (PHG115D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Physics)

This module includes: Basic Mathematical Concepts for Physics and measurements; Mechanics (Forces and Newton's Laws of Motion, Friction, Dynamics of Circular Motion, Drag Forces, 1D, 2D and Rotational Kinematics); Thermodynamics (Temperature and Heat); Waves and Sound; Electric and magnetic fields and Forces; Electromagnetic Waves; Optics and Light. (Total notional time: 100 hours)

PLASTICS CONVERSION I (PCO206B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

The purpose of this module is to introduce students to polymer process engineering concepts and principles, to enable them to analyse polymer processing operations in terms of common elementary and shaping steps. At the end of the module, if all the tutorials, tests and assignments are completed successfully, the student will be able to identify, analyse, and solve broadly-defined polymer processing problems. (Total notional time: 280 hours)

PLASTICS CONVERSION II (PCO307B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

The purpose of this module is to introduce students to the pre-processing of plastic materials as well as post-production operations in order to achieve the final desired product. At the end of the module, if all the tutorials, tests and assignments are completed successfully, the student will be able to identify, analyse, solve, evaluate, critically reflect, and address broadly-defined problems. (Total notional time: 280 hours)

PLASTICS DESIGN PROJECT (PDP307B/PDP317R) **PROJECT ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

The purpose of the module is to provide a holistic and systematic understanding and knowledge of produc design. The module is designed and envisaged to mimic real workplace product design problems in which individuals work as part of a collective but also have responsibilities assigned particularly to them. At the end of this module, students can undertake advanced tasks related to the design of injection moulded polymer products and the tools to produce them. (Total notional time: 280 hours)

PLASTICS MATERIAL SCIENCE I (PMI216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

The purpose of this module is to impart fundamental knowledge of the relationships that exist between the structures and properties of materials and based on these structure-property correlations, students are able to understand the process of designing or engineering the structure of a material to produce a predetermined set of properties. (Total notional time: 140 hours)

PLASTICS MATERIAL SCIENCE II (PMI307B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

This module builds on to the knowledge gained in the Plastics Material Science module. The purpose of this module is to equip the students with fundamental and application knowledge of polymer materials, in terms of the phase structure, properties, process requirements and applications, building on to knowledge gained in the Plastics Material Science I module. (Total notional time: 280 hours)

PLASTICS PART AND TOOL DESIGN (PPT206B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

The purpose of this module is to equip students with essential skills to design an injection-moulded part and the tool required to produce it. The module aims to prepare students for their design project in the final year by introducing the fundamental aspects of plastic part design and tool (mould) design. (Total notional time: 280 hours)

PLASTICS TECHNOLOGY (PTY105B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

The purpose of this module is to equip the student with sufficient knowledge to understand the variations of selecting a suitable polymer resin together with suitable additives and be able to relate it to a suitable process so that a well-defined product can be manufactured. This module gives an understanding of a polymer, its structure and its properties, which will enable the student to have a fundamental understanding of the concepts of material and manufacturing processes used. (Total notional time: 280 hours)

POLYMER CHEMISTRY (PYC216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Free radical polymerisation of vinyl polymers; ionic polymerisation of vinyl polymers; vinyl polymerisation with complex coordination catalysts; vinyl polymers properties and application; reactions of vinyl polymers; step growth and ring-opening polymerisation of non-vinyl polymers; and natural and biodegradable polymers. (Total notional time: 140 hours)

POLYMER MATERIALS (PYT118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Introduction to polymer composites; Polymer matrices; Reinforcements used in polymer matrix composites; Principles and features of polymer matrix composites; Characterisation of polymer matrix composites; Applications of different composite materials; and Designing a polymer matrix reinforced fibre composites. (Total notional time: 150 hours)

POLYMER PROCESSING (PYP118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Review of polymer properties; Polymer rheology; Mixing and compounding; Polymer extrusion; Advanced Injection moulding processes; and Thermoset and fiber-reinforced plastics processing. (Total notional time: 150 hours)

POLYMER SCIENCE (SYS118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Polymer architecture, microstructure and morphology; Polymer molecular mass determination; Polymer chemical composition and molecular microstructure characterisation; Polymer morphology characterisation; and Reactions of polymers. (Total notional time: 150 hours)

POWER AND DISTRIBUTED GENERATION (PDG118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Introduction (structure of a power system); Steady state analysis (line load ability, reactive compensation); Load flow studies; Short-circuit analysis; Transient analysis (numerical methods of solution, direct methods of analysis); HVDC, FACTS and stabilising devices; and Power system control. (Total notional time: 150 hours)

POWER ELECTRONICS (PWE117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Review of Power Semiconductor devices; Review of Electronic circuits used in Power Electronics control circuits; Gate drive and snubber circuits; Single-phase controlled rectifier design; DC converter design; Single-phase inverter design. (Total notional time: 140 hours)

POWER ELECTRONICS (PWE316D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Operation and limitations of power semiconductor devices and basic methods to prevent the failure. AC Voltage Controllers. Single-phase and three-phase uncontrolled rectifiers. Power conversion single-phase and three-phase inverters with PWM (DC-to-AC power conversion). Basic DC-to-DC power conversion. (Total notional time: 120 hours)

POWER PLANT (PWP118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

Introduction to power generation; Turbines; Steam generators; Condensers; Gas generators; Engine power plants; and Renewable Energies. (Total notional time: 150 hours)

POWER SYSTEMS (PWS117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Transmission line parameters; Transmission lines: Steady State; Power Flows; Transient Stability; Power System Control. (Total notional time: 140 hours)

POWER SYSTEMS (PWS307B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

The basic operation and the requirements of the different types of power stations. Evaluate and comparison of the power stations in terms of their performance, cost-effectiveness and impact on the environment. Selection of the most economical supply system and conductor size for a new power line. Design of transmission lines. Sizing of cables for power distribution. Power flow analysis and stability analysis in planning and operation of power systems. Power system protection, principle of operation of circuit breakers, and fuses and relays. Analysis of fault levels in the power systems. Protective relaying in power systems. (Total notional time: 280 hours)

POWER SYSTEMS I (PWS216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

The three major components of a power system are generation, transmission and distribution. Theory and applications: load curves, economics of power generation and tariffs of supply, power factor improvement, power supply systems, design and performance of overhead transmission lines, distribution systems and underground cables.(Total notional time: 120 hours)

POWER SYSTEMS II (PWS316D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Introduction to electrical protection: main components. Symmetrical faults calculation and methods of limiting fault currents. Principle of operation of circuit breakers, and fuses. Principle of operation of relays. Implement protective relaying schemes for alternators, transformers, busbars and lines. (Total notional time: 240 hours)

PRECISE ENGINEERING SURVEYING (PCS107V) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Geomatics)

The purpose of this module is to enable survey projects in support of engineering works, where the surveyor is required to produce results better than the precision expected in standard tasks such as topographical surveys and setting out. Units include Instrumentation for precise surveying, Precise engineering surveying methods, Deformation Surveying and Structural Monitoring, Setting out, GNSS for Precise Surveying, Inertial Navigation Systems, and 3D Laser Scanning. (Total notional time: 240 hours)

PRESENTATION DRAWING (PDW206D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Mastering of drawing and rendering skills using a variety of mediums so that these can be used effectively, efficiently and convincingly to develop, communicate, express, sell and record design. (Total notional time: 200 hours)

PRESENTATION TECHNIQUES I (PTR105P, PTR005P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Fundamental architectural presentation drawings and sketching, focusing on: (1) Drawing concepts (perception and relationships of lines, shapes and spaces). (2) Techniques (line work, typography and hatching). (3) Model building. (4) Contextual and scaling elements. (5) Layout and composition. (6) 3D sketching, perspectives and graphic presentation; and (7) Self-expression and meaning in a drawing. (Total notional time: 120 hours for PTR105P and 60 hours for PTR005P)

PROBABILITY AND STATISTICS (PAS117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mathematics and Statistics)

Data Handling; Combinatorics; Probability and Probability Models; Normal Distribution and Sampling; Statistical Inference. (Total notional time: 140 hours)

PROBABILITY AND STATISTICS (PAS206B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mathematics and Statistics)

Sampling techniques and descriptive statistics. Probability. Counting rules. Inferential statistics. Analysis of variance. Regression and correlation analysis. Non-parametric tests. (Total notional time: 140 hours)

PROCESS AUTOMATION (PAU307B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to provide the student with a fundamental understanding essential for technicians and technologists working in the automation engineering field. (Total notional time: 280 hours)

PROCESS FLUID FLOW (PFF216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Materials Engineering)

Fluid statics and dynamics principles; Incompressible flow in pipes and channels for Newtonian and non-Newtonians; Flow of compressible fluids in pipes; Two-phase flow; Pumps and valves; and Mixing of Newtonian liquids in tanks. (Total notional time: 140 hours)

PROCESS INSTRUMENTATION I (PCI216D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

This module teaches students the required knowledge and skills to understand and apply the basic principles of all the different types of sensors and instruments for process control (flow, temperature, pressure, level), Electronic detectors, transmitters, actuators and their applications and PLC control systems. The knowledge and skills are required to define, design, construct, commission and maintain a process control system. (Total notional time: 120 hours)

PROCESS INSTRUMENTATION II (PCI316D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

The use of measuring instruments, valves, pumps, tanks, piping, vessels, turbines and motors in various plant operations and systems. Process control diagrams, control strategies and operation of plant units for boilers, heat exchangers, furnaces, cooling towers and distillation systems. Instrumentation for hazardous environments. (Total notional time: 240 hours)

PROCESS METALLURGY AND DESIGN (PMD307B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Design Development; General Design Consideration; ComputerAided Design (CAD); Design and Optimisation of a Mineral Processing Plant; Furnace Design; and Project. (Total notional time: 280 hours)

PRODUCT DESIGN IV (PDE107V) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Study at this level is conducted from a cooperative working relationship within a development group, the members of which may come from marketing, engineering, manufacturing, research and development, software development, or other professions. The ability to function and independently manage the design process as part of a multidisciplinary team is therefore essential. The qualifying undergraduate student should therefore be capable of integrating, interpreting and applying knowledge from a range of disciplines to respond to changing technologies, materials and social environments to design specific products and solutions selected from diverse fields of business. The qualification also provides an essential background for industrial design specialisation studies that support design and research activities within the tertiary training community. (Total notional time: 1000 hours)

PRODUCTION AND AUTOMATION (PAA206B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Manufacturing processes, design and development of products. Theory, laboratory work and practical. Manufacturing and the technologies associated with the design and analysis of product processes. Automation and associated technologies. (Total notional time: 420 hours)

PRODUCTION ENGINEERING (PRE206B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Identifying and investigating factors that hamper productivity in the organisation; Selecting the appropriate methodologies that will solve operational problems; Proposing solutions to operational dysfunctions by applying the prescribed methodologies; Identifying and investigating factors that hamper productivity in the organisation; proposing solutions to operational dysfunctions by applying the prescribed method study techniques; Selecting the appropriate direct work measurement technique(s) to measure the work content of a given task; Whilst taking into consideration the work environment, The human factor and the impact of technology on the particular business environment. (Total notional time: 280 hours)

PRODUCTION METALLURGY (PDM307B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Bulk deformation processes; Foundry technology; Metal powder processing; Metal joining methods; Welding; Metal sheet welding processes; and Advanced manufacturing techniques. (Total notional time: 280 hours)

PROFESSIONAL PRACTICE I (PFR125P, PFR025P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Written and oral communication in the architecture profession, focusing on: (1) Relevant terminology and professional vocabulary. (2) Report writing. (3) Academic writing and referencing; and (4) Verbal presentation. Local Authority building plan submission and approval processes, focusing on: (1) Town planning schemes (building lines, street setback, zoning etc.). (2) Preparing drawings for approval. (3) Preparing required application forms and other documentation for submission; and (4) Checklists for Local Authority submission. Fundamental Building Surveying, focusing on: (1) Basic surveying methods. (2) Practical levelling and contouring. (3) Setting out of buildings. (4) Introduction to Geographic Information Systems (GIS). (5) Basic use and application of the Global Positioning System (GPS). (6) Cadastral, referencing and photogrammetry software; and (7) Fieldwork practice. (Total notional time: 60 hours for PFR125P and 30 hours for PFR025P)

PROFESSIONAL PRACTICE II (PFR216P) **WORK-INTEGRATED LEARNING**

(Module custodian: Department of Architecture and Industrial Design)

Intermediate Professional Architectural Practice, based on the Work-Integrated Learning experience during a supervised internship at an approved architectural practice, including the following aspects: (1) The structure and regulation of the profession, specifically: Overview of the profession; Statutory and voluntary bodies; Categories of registration; and the Building delivery process (with reference to the SACAP work stages). (2) SAIA practice manual, specifically: Role of the principal-agent and consultants; Agreement between architect and client; and the Relationship between and responsibilities of the architect / consultants / client / contractor and subcontractors. (3) Contracts and tenders, specifically: Types of building contracts; Tender procedures; The building contract; Forms of subcontractors; and Dispute resolution. (4) Local Authority, specifically: Town planning schemes (building lines, street setback, zoning, etc.); Preparing drawings for approval; Preparing required application forms and other documentation for submission; Submission of drawings for approval; and Follow-up visits to obtain approval. (5) Architectural projects, specifically: Management of architectural projects, and Accompanied site inspections and attending site meetings. (6) Office management, specifically: Office procedures and protocols; and the Issuing of drawings and other documentation. (7) Professional demeanour, specifically: Attributes of an architectural professional and techniques for time management, efficiency and productivity. (Total notional time: 360 hours, consisting of 300 hours of Work-Integrated Learning and 60 hours instructional time)

PROFESSIONAL PRACTICE III (PFR327P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Advanced Digital Building Surveying, focusing on: (1) Pertinent hardware and software used for photogrammetry and 3D-object scanning. (2) Field exercises, resulting in data collection, data translation and object production, and the (3) Documentation, presentation; and transfer of collected data to other applications. (Total notional time: 60 hours)

PROFESSIONAL PRACTICE IV (PFR418P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Expert study of Professional Architectural Practice, focusing on: (1) The legal implications of professional architectural services. (2) Ethics in architectural practice. (3) SACAP (Client-Architect agreement, Board Notices and other published documents). (4) Professional indemnity insurance. (5) SAIA Practice Manual. (6) Pertinent South African laws. (7) Different building contracts; and (8) Dispute resolution. Expert study of Architectural Practice Management, focusing on: (1) The economics of professional architectural services. (2) Management styles and approaches. (3) Financial management. (4) Establishing a small business; and (5) Entrepreneurship. Fundamental study of Quantity Surveying, focusing on: (1) The methodology of measuring. (2) Building cost estimates. (3) Feasibility studies. (4) Economic design. (5) Contract administration; and (6) Valuation of buildings. (Total notional time: 120 hours)

PROJECT COST MANAGEMENT (PJC118G) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Sciences)

Students will complete a project within an approved budget. Beginning with estimating, a vital tool in Project Cost Management, actual historical data is used to accurately plan all aspects of the project. As the project continues, job control uses data from the estimate with the information reported from the field to measure the cost and production in the project. (Total notional time: 120 hours)

PROJECT ENGINEERING (POE215B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Need for and advantages of project management. Definition of the project. Modern project planning methods. Communication and presentation of information. Feasibility studies (affordability). Project implementation. Support of the operational systems. Case studies, projects and computer applications. (Total notional time: 140 hours)

PROJECT MANAGEMENT (PMA109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

This module addresses the core project management methods and practices required from the built environment professional. The complex environmental and legal framework within which professional service delivery takes place are investigated against the background of current office practices. (Total notional time: 180 hours)

PROJECT MANAGEMENT - ENGINEERING SURVEYING (PSR117V) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Geomatics)

The purpose of this module is to equip students with all aspects of managing a project. Issues of workplace ethics and professional conduct. Provide the student with the essential understanding of how projects are managed as qualified geomatics technologists. Sensitive issues of development of professional ethical standards, aspects of town planning, property law and land use management are incorporated into this module as it is pertinent to the project management environment by geomatics technologists. (Total notional time: 120 hours)

PROJECT MANAGEMENT V (PRM109M) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Sciences)

Introduction to construction management. Construction procurement and tender processes. Project implementation strategies. Scope and integration management. Planning, coordination, monitoring, evaluation and control through the project cycle. Tools of planning. Construction time management. Construction cost management. Value engineering. Earned value management. Human resource management and productivity. Plant, equipment and labour. Quality control of civil and building works. Risk management and tools of analysis. Communication in construction and stakeholder management. Legal framework for health, safety and environment. Application of environment, safety and health in the construction industry. Post-construction management concepts. Asset management and retrofitting. (Total notional time: 360 hours)

PROJECT MANAGEMENT: SURVEYING (PRS317B) **PROJECT ASSESSMENT**

(Module custodian: Department of Geomatics)

Outline project management. Project management and organisation. Project feasibility and scheduling. Project selection. Acquiring project resources and outlines using teams and disposing of project information appropriately. Demonstrate knowledge of project management philosophy. Evaluate project control and closure. Prepare project plans. Define project risk management. Review project objectives for timely project completion. Determine the impact of the HIV/AIDS pandemic. Identify good ethical and professional conduct. (Total notional time: 120 hours)

PROJECT METALLURGY (PML307B/PML317R) **PROJECT ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

This module focuses on the various learning skills needed to understand the features, importance and procedure for conducting a research project. This module is an introduction to Project Metallurgy, Project Communication Research Project Design, Materials Testing and Analyses and Technical Report Writing. (Total notional time: 280 hours)

PROJECTS (PJT215D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Group applications projects: research, building (planning, design, layout), construction, testing, documentation and oral presentation of complete projects. (Total notional time: 120 hours)

PROPERTY LAW AND VALUATIONS (PLV117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Sciences)

Introduction to the Law of Property, matters such as legal objects, property rights, real rights and creditor's rights, introduction to ownership, co-ownership, statutory land use, limitations on ownership, original acquisition of ownership, derivative acquisition of ownership, protection of ownership, termination of ownership, possession and holder ship, Introduction to possession and holder ship, acquisition of possession and holder ship, protection of possession and holder ship, termination of possession and holder ship, limited Real Rights and other Rights in Property, introduction to limited real rights and other rights in property, servitudes and restrictive conditions, real security: pledge and mortgage, Real security rights created by law, other property rights, Constitutional Property Law, introduction to Constitutional Property Law, property rights: Section 25, reform of property law, property valuation, introduction to property valuation, legislation in property valuation, property development, introduction to property development, and legislation in property development. (Total notional time: 120 hours)

PYROMETALLURGY (PYM216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Simple Stress and Strain; Torsion of Circular Shafts; Temperature Stresses; Catenaries; Beams-Shear Force and Bending Moment. (Total notional time: 140 hours)

Q

QUALITY ENGINEERING (QEN129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Differing Perspectives of Quality and Quality Theory, Global Supply Chain Quality and Quality Standards, Strategic Quality Planning Aligned with the Voice of the Customer and Market, Quality in Designing Product and Services, Quality Tools and Six Sigma, Implementing and Validating the Quality System, ISO Quality Standards. (Total notional time: 150 hours)

QUALITY ENGINEERING (QEN118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Introduction to quality infrastructure; South Africa quality infrastructure; Total quality methodologies in engineering; Advanced statistical approaches to quality; Total quality project management; Quality assurance for systems engineering; and Quality in supply chain design. (Total notional time: 150 hours)

QUALITY ENGINEERING AND MANAGEMENT SYSTEMS (QMS307B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Analyse different management systems and processes to ensure effective operations. Enhance the understanding of quality and management systems in industry. Knowledge regarding management and management systems to solve broadly-defined engineering problems in the industrial engineering environment. Problem-solving will be developed. (Total notional time: 280 hours)

QUANTITY SURVEYING V (QSU109M) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Sciences)

Trends in the Quantity Surveying profession. Supply chain management, trends in procurement and e-procurement. Partnering, alliancing and joint ventures. Cost modeling and optimisation for construction projects pre-construction, construction and post-construction. Cost optimisation in the Building Information Management (BIM) platform. Risks, uncertainty and accuracy of cost estimating. Cost indices and cost appraisal. Alternative dispute resolution. Integrated quantity surveying case study. (Total notional time: 360 hours)

QUANTITY SURVEYING PROFESSIONAL PRACTICE (QSF118G) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Sciences)

Quantity surveying as a profession, Legal dimensions of a practice, Registration of a practice, Professional ethics, developing a practice, starting up, Legal structure, Individual/sole proprietor, Partnership, Close corporations, Companies, Focusing on the practice, Marketing, running a practice, Administration, Financial planning, Insurance coverage, Personnel, hiring, Basic conditions of employment, Client agreements, Client Consultant Professional Services Agreement (PROCSA), Professional fees. QS IDOW. Professional Ethics and implement Project service quality assurance on Built Environment Projects. (Total notional time: 120 hours)

QUALITY SYSTEMS AND PROCESS IMPROVEMENTS (QSP115C) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
Application of quality techniques and methods in different manufacturing and service processes. Contribute towards the continual quality improvement in manufacturing and services processes. Develop the student in self-study and problem-solving methods. Personal and professional ethics are addressed during the course of the module. (Total notional time: 140 hours)

R

REAL ESTATE STUDIES (REE107V) **1 X 3-HOUR PAPER**
(Module custodian: Department of Building Sciences)
The basic principles of urban land economics and township development; The theory and practice of housing development and management; Local authority land use management; Real Estate Economics and Mixed Developments; Sustainable Rural Development, Housing and Urbanisation; and The Government and Strategic Real Estate Policies. (Total notional time: 240 hours)

REFRIGERATION AND AIR CONDITIONING (RRC118S) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
Refrigeration; The vapour-compression cycles; Load calculation; Compressors; Condensers; Evaporators; Expansion devices; Refrigerants; Refrigeration systems; Air conditioning; Introduction to air conditioning; Psychrometry and psychrometric chart; Indoor environment quality; Heating and cooling load calculations; Air conditioning processes and systems; Thermal distribution systems; and Space air distribution. (Total notional time: 150 hours)

REFRACTORY ENGINEERING (RFN216B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Chemical, Metallurgical and Material Engineering)
Refractory Materials, compositions and Forms; Refractory Engineering and installation Technology; Refractory in Steelmaking Industry; Refractory in the Ferro-Alloy Industry; Refractory in the Non-Ferrous Industry; Refractory in the Foundry Industry; Refractory in other Industries. (Total notional time: 140 hours)

REMOTE SENSING (RSS206D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Geomatics)
This module introduces the principles lying behind remote sensing, concentrating on space-borne platforms. The fundamentals of Electromagnetic Radiation are explained, as are its interactions with Earth's surface and atmosphere. The module goes on to examine sensor characteristics, satellite orbits and various current and future missions involving a range of sensors across the visible, radar and microwave components of the spectrum. When dealing with images, the skills of image processing are used to extract meaning and interpretation from the spatial relationships of data, and the basics of image processing are also taught. The module includes many examples of applications of remote sensing to environmental questions. (Total notional time: 240 hours)

REMOTE SENSING I (RSS307B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Geomatics)
Elementary image processing. Sensor calibration. Deriving object information from Remote Sensing data. Digital image classification. Laser Scanning Remote Sensing. Advanced Remote Sensing data manipulation. (Total notional time: 240 hours)

RENEWABLE ENERGY (REN316D) **1 X 3-HOUR PAPER**
(Module custodian: Department of Electrical Engineering)
Fundamentals on Energy Conversion; Solar (Photovoltaic) Energy Conversion; Hydro Power Conversion; Wind Energy Conversion Systems; Energy Storage. (Total notional time: 120 hours)

RESEARCH METHODOLOGY (RCG117V) **1 X 3-HOUR PAPER**
(Module custodian: Department of Building Sciences)
The research process; The literature review; The research strategy; Methodological frameworks; A quantitative research approach; A qualitative research approach; Combining methods and mixed methods; and writing up the research. (Total notional time: 120 hours)

RESEARCH METHODOLOGY (RES118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Conceptual Design (research objective, research framework, research questions, defining concepts, conceptual modelling); Technical Design (research strategies, research material, research planning); Communicating your research (thesis/dissertation/project layout, research proposal, oral presentation, referencing, style; research paper writing); Statistics in research; and Research Professionalism (plagiarism, ethics in research, predator journal avoidance, intellectual property (IP) in research). (Total notional time: 100 hours)

RESEARCH METHODOLOGY (REV118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Conceptual Design (research objective, research framework, research questions, defining concepts, conceptual modelling); Technical Design (research strategies, research material, research planning); Communicating your research (thesis/dissertation/project layout, research proposal, oral presentation, referencing, style; research paper writing); Statistics in research; Research Professionalism (plagiarism, ethics in research, predator journal avoidance, intellectual property (IP) in research). (Total notional time: 100 hours)

RESEARCH METHODOLOGY (RGM118G) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Geomatics)

When complex theoretical and technical problems are solved, new knowledge is created. This module focuses on the research process and methods of inquiry to solve such problems. This involves evaluating current research in the geomatics disciplines and developing competence in using instruments and software to collect data, evaluate results and judge the quality and limitations of research. Emphasis is also placed on the verbal and written communication of research findings to specialist audiences. (Total notional time: 100 hours)

RESEARCH METHODOLOGY (RMD109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Building Sciences)

Study designs, proposal writing, sample size and power calculations, descriptive and univariate methods of data analysis such as descriptive statistics and graphs, one-sample tests and confidence intervals, two-sample tests and confidence intervals, Pearson's chi-square tests of association, multivariate methods of data analysis such as simple and multiple linear regression analysis, logistic regression analysis, qualitative research methods, use of commonly used statistical packages such as STATA, SPSS, NVIVO and ATLAS for quantitative and qualitative data analysis. (Total notional time: 180 hours)

RESEARCH METHODOLOGY (RMD209M/R) **PROJECT ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Equipping students with the skills and knowledge of architectural research. Students will develop a research proposal, dissertation and a research paper/article. Students will learn about the administrative processes in the research process, how to identify research topics, how to define a research problem and its setting, how to plan a research project, including considering the funding implications of a project. Consider the design process and design thinking as a tool for managing the research process and tacking on an architectural design problem by solving conflicting problems and investigating precedent studies. Technical aspects of developing a dissertation such as format, layout, numbering, bibliography and referencing systems. (Total notional time: 40 hours)

RESEARCH METHODOLOGY (REA118S, REL118S, REI118S, REY118S, RME118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Conceptual Design (research objective, research framework, research questions, defining concepts, conceptual modelling); Technical Design (research strategies, research material, research planning); Communicating your research (thesis/dissertation/project layout, research proposal, oral presentation, referencing, style; research paper writing); Statistics in research; and Research Professionalism (plagiarism, ethics in research, predator journal avoidance, intellectual property (IP) in research). (Total notional time: 100 hours)

RESEARCH METHODOLOGY (RGM117V) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Geomatics)

This module equips students with the ability to conduct scientific research. This is achieved through hands-on training in research concepts that lead to successful research execution and the design of academic or scientific documents and communication of the research findings. The major topics covered in this module include plagiarism, referencing, scientific writing, research processes and research design. Upon completion of this module, students should be able to design a clear and concise research proposal together with the literature survey in the geomatics fields. (Total notional time: 120 hours)

RESEARCH METHODOLOGY V (RAT109M/R) **PROJECT ASSESSMENT**
(Module custodian: Department of Architecture and Industrial Design)
This module explores the scope and nature of the dissertation, administrative procedures, research topics, the problem and its setting, research proposals, applications for funding, research protocols and research planning. The module includes the technical structure of a dissertation: format, layout, numbering system, typography, bibliography and referencing. The product of this module is a well-formulated research proposal. (Total notional time: 90 hours)

RESEARCH METHODOLOGY: QUANTITY SURVEYING (RQS117V) **1 X 3-HOUR PAPER**
(Module custodian: Department of Building Sciences)
This module will provide the knowledge needed to: understand and apply the research processes to construction-related problems and questions and to define a research problem within the built Environment Field. The study is to include qualitative versus quantitative approaches. Sourcing of information and literature reviews. Harvard method of citation. Sampling, research instruments, Hypotheses, research objectives, referencing methodology, Survey instruments, data collection, data analysis etc. Students will be able to formulate a research proposal (Total notional time: 120 hours)

RESEARCH PROJECT PART A (RP129AN) **PROJECT ASSESSMENT**
RESEARCH PROJECT PART B (RP129BN) **PROJECT ASSESSMENT**
RESEARCH PROJECT PART C (RP129CN) **PROJECT ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
Each student must identify an appropriate topic within the chosen discipline of Engineering Management and prepare a proposal which must be approved after an oral presentation by the Departmental Research and Innovation Committee. Under the guidance of an assigned academic supervisor, the student must demonstrate an understanding of the conceptualisation of the research problem and critical review of the underlying theory and relevant literature. The student must conduct a thorough literature review, design and explain the research methods used and demonstrate the application of appropriate tools of data analysis. The student should further discuss the results, make conclusions and recommendations. The research must be systematic and logical and follow academic research reporting norms and be written in a satisfactory language. (Total notional time: 150 hours)

RESEARCH PROJECT: CIVIL ENGINEERING (RCE108S, RCE118R) **PROJECT ASSESSMENT**
(Module custodian: Department of Civil Engineering)
Project Design and Development; Conference poster and oral presentation; Proposed design and preliminary results; Conference paper and oral presentation; Final implementation and results; Final Report: Introduction and project plan, literature review, detail design and implementation, test results and conclusion. (Total notional time: 300 hours)

RESEARCH PROJECT: ELECTRICAL ENGINEERING (REG108S, REG118R) **PROJECT ASSESSMENT**
(Module custodian: Department of Electrical Engineering)
Project Design and Development; Conference poster and oral presentation; Proposed design and preliminary results; Conference paper and oral presentation; Final implementation and results; Final Report: Introduction and project plan, literature review, detail design and implementation, test results and conclusion. (Total notional time: 300 hours)

RESEARCH PROJECT: INDUSTRIAL ENGINEERING (RIE108S, RIE118R) **PROJECT ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
Project Design and Development; Conference poster and oral presentation; Proposed design and preliminary results; Conference paper and oral presentation; Final implementation and results; Final Report: Introduction and project plan, literature review, detail design and implementation, test results and conclusion. (Total notional time: 300 hours)

RESEARCH PROJECT: MECHANICAL ENGINEERING (RMH108S, RMH118R) **PROJECT ASSESSMENT**
(Module custodian: Department of Mechanical and Mechatronics Engineering)
Project Design and Development; Conference poster and oral presentation; Proposed design and preliminary results; Conference paper and oral presentation; Final implementation and results; Final Report: Introduction and project plan, literature review, detail design and implementation, test results and conclusion. (Total notional time: 300 hours)

RESEARCH PROJECT: MECHATRONICS ENGINEERING (RPM108S, RPM118R) **PROJECT ASSESSMENT**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

Project Design and Development; Conference poster and oral presentation; Proposed design and preliminary results; Conference paper and oral presentation; Final implementation and results; Final Report: Introduction and project plan, literature review, detail design and implementation, test results and conclusion. (Total notional time: 300 hours)

RESEARCH PROJECT: METALLURGICAL ENGINEERING (RMY108S, RMY118R) **PROJECT ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Project Design and Development; Conference poster and oral presentation; Proposed design and preliminary results; Conference paper and oral presentation; Final implementation and results; Final Report: Introduction and project plan, literature review, detail design and implementation, test results and conclusion. (Total notional time: 300 hours)

RESEARCH PROJECT: POLYMER TECHNOLOGY (RPC108S, RPC118R) **PROJECT ASSESSMENT**

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Project Design and Development; Conference poster and oral presentation; Proposed design and preliminary results; Conference paper and oral presentation; Final implementation and results; Final Report: Introduction and project plan, literature review, detail design and implementation, test results and conclusion. (Total notional time: 300 hours)

RESEARCH REPORT: ARCHITECTURAL TECHNOLOGY: TECHNOLOGY V (ATG109M/R) **MINI-DISSERTATION ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

The mini-dissertation investigates a relevant research problem. A review paper or a research paper based on the research has to be accepted for publication in a DHET-accredited journal. (Total notional time: 900 hours)

RESEARCH REPORT: ARCHITECTURE: PROFESSIONAL V (ARP209M/R) **MINI-DISSERTATION ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Equipping students with the skills and knowledge needed towards the completion of an architectural project and presenting it in an exhibition and mini-dissertation. The production of the mini-dissertation is a studio-based procedure, led by supervisors, co-supervisors and design-supervisors, where activities are planned to address discipline- and industry-specific requirements. The module is student-centred and engenders independent, critical thinking and synthesis. Skills will be developed in research problem definition, design concept development and building design resolution leading up to the production of a refined final architectural design, technical resolution, and detailing. Working in the design studio (under supervision of the programme coordinator and assigned design supervisor) is compulsory. (Total notional time: 900 hours)

RESEARCH REPORT: BUILDING SCIENCE V (RCP109M/R, RCP119R) **MINI-DISSERTATION ASSESSMENT**

(Module custodian: Department of Building Sciences)

Each student must identify an appropriate topic within the chosen discipline and prepare a proposal which must be approved by the Departmental Research Committee (DRC). Under the guidance of an assigned academic supervisor, the student must demonstrate an understanding of the conceptualisation of the research problem and a critical review of the underlying theory and relevant literature. The student must design and explain the research methods used and demonstrate the application of appropriate tools of data analysis. The studnent should further discuss the results and make conclusions and recommendations. Final Report: Introduction and project plan, literature review, detail design and implementation, test results and conclusion. (Total notional time: 900 hours)

RESEARCH REPORT: CONSTRUCTION MANAGEMENT (RRM108G, RRM118R) **PROJECT ASSESSMENT**

(Module custodian: Department of Building Sciences)

This module focuses on assisting the student to develop research capabilities by proposing a research topic, which is centred on contemporary construction related challenges. The students are expected to work independently under the supervision-designated members of academic faculty. In carrying out this assigned task the student is expected to demonstrate the following capabilities through his/her treatise namely the ability to identify problems confronting construction management, urban development and quantity surveying practice; ability to articulate research questions/ or propositions; highlight the aim of the research study; develop a set of objectives for the proposed study; articulate clear, robust and achievable research design and appropriate data collection and analysis techniques; identify and review the relevant literature and; critically analyse the data obtained. Students are also expected to adhere to the relevant ethical practices and standards during the process of data collection and analysis as well as report writing. This module will not consist of contact sessions as the prospective students are expected to have fundamental knowledge in research methodology. (Total notional time: 240 hours)

RESEARCH REPORT: QUANTITY SURVEYING (RQS108G, RQS118R) **PROJECT ASSESSMENT**

(Module custodian: Department of Building Sciences)

This module focuses on assisting the student to develop research capabilities by proposing a research topic, which is centred on contemporary construction-related challenges. The students are expected to work independently under the supervision-designated members of the academic faculty. In carrying out this assigned task the student is expected to demonstrate the following capabilities through his/her treatise namely the ability to identify problems confronting construction management, urban development and quantity surveying practice; ability to articulate research questions/ or propositions; highlight the aim of the research study; develop a set of objectives for the proposed study; articulate clear, robust and achievable research design and appropriate data collection and analysis techniques; identify and review the relevant literature and; critically analyse the data obtained. Students are also expected to adhere to the relevant ethical practices and standards during the process of data collection and analysis as well as report writing. This module will not consist of contact sessions as the prospective students are expected to have fundamental knowledge of research methodology. (Total notional time: 240 hours)

ROBOTIC SYSTEMS (RSY118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Introduction to robotic systems; Robotic sensors and actuators; Position and orientation in space; Forward and inverse kinematics; Jacobian matrix; Dynamic models of robotic systems; and Control of robotic systems. (Total notional time: 150 hours)

RURAL AND URBAN PLANNING (RUP317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Geomatics)

History of Rural and Urban Planning. Land tenure in Rural South Africa. Town and Regional Planning Law and Practices. Land use Planning and Zoning. Township Design. Metropolitan Region Interventions. Global City Regions. (Total notional time: 120 hours)

S

SATELLITE SURVEYING AND GEODESY (SSY107V) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Geomatics)

The purpose of this module is to equip Geomatics Technologists with competence in applying the theoretical basis for calculations on ellipsoids and on different map projections they use in day-to-day practice. The technologists will acquire an understanding of the theoretical basis for calculations and reliability analysis of coordinates and heights. They will acquire an understanding of Spherical Astronomy, Geodesy and Map Projections, Coordinate Systems and 3D rotations, Terrestrial versus geodetic coordinate systems, Geodetic principles, Global Navigation Satellite Systems, Gravimetry and gravity field of the earth, High precision GNSS Geodesy, Satellite Coordinate Systems, Satellite orbits and parameters, Principles of position location using satellites, Numerical expression of the coordinates of the observer with reference to satellites, Least Squares and Point positioning using pseudo range. (Total notional time: 240 hours)

SCIENTIFIC COMPUTING (SCP216B, SCP316B, SHM216B, SIE216B, SML216B, SPT316B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Scientific computing and programming environment. Fundamentals of programming: Selection and loop statements. Use-defined functions. Input, output and graphics. Engineering application case studies and simulations. (Total notional time: 140 hours)

SIGNAL PROCESSING (SPR117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Introduction to signals and systems; Time-domain analysis of continuous-time systems; Signal representation by Fourier series; Continuous-time system analysis using Fourier transform; Continuous-time system analysis using Laplace transform; Frequency response and analogue filters; and Project. (Total notional time: 140 hours)

SIGNAL PROCESSING (SPR307B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Introduction to signals and systems; Time-domain analysis of continuous-time systems; Signal representation by Fourier series; Continuous-time system analysis using Fourier transform; Continuous-time system analysis using Laplace transform; Frequency response and analogue filters; Discrete-time signals and systems; Time-domain analysis of discrete-time systems; Fourier analysis of discrete-time signals; Discrete-time systems analysis using the z-transform; Frequency response and digital filters. (Total notional time: 280 hours)

SIMULATION DESIGN (SID216B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Modes of simulation and its application in solving real-life engineering problems. Knowledge of Simulation Design is essential for component development in engineering disciplines. Introduce simulation software, operations scheduling and other modules to become competent in simulation designs. The relationship between simulation design and real-life models will be emphasised in all units. (Total notional time: 140 hours)

SITE SURVEYING (SSV215D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Science)

Spatial surveying and methods of measurement; scale drawings; preparation of contours and use of laser equipment; survey of existing buildings; practical work that involves setting out of sites and buildings by levelling and tachometry, determining contours and heights using levelling instruments, theodolite and Dumpy level and Geographic Information System (GIS) mapping. (Total notional time: 100 hours)

SOFTWARE DESIGN (SFD117V) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Variables and I/O; Loops (for / while); Program Flow (if - else); Functions; Structures; Pointers; GUI's; Dynamic Data Types; Classes and Objects; Networking. (Total notional time: 140 hours)

SOFTWARE DESIGN (SFD115D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Developing and applying structured programming. The core outcomes focus on basic C programming. This includes basic input/output, conditional execution, statement repetition, functions, libraries and one-dimensional arrays. The module is very practical, and the assessment is based on several programming tasks and/or tests completed during the semester. (Total notional time: 120 hours)

SOIL TECHNOLOGY (STC115C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

Soil properties. Geotechnical site investigation. Soil tests and result interpretation and safety system. (Total notional time: 140 hours)

SPECIFICATION V (SFN209M/R) **PROJECT ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

An introduction to the National Building Specifications (NBS) software package (or other approved specification software). Preparation of on-screen specifications for the building industry. Integrated with technical resolution of the design proposal. (Total notional time: 40 hours)

STATISTICS (SAI115D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mathematics and Statistics)

Presentation of statistical data and introduction to probability. Inferential statistical applications such as mean, standard deviation, and descriptive statistics. (Total notional time: 100 hours)

STATISTICS (SAT115C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Introduction to statistics. Descriptive statistics: graphical representation of data, measurements of central position, measures of dispersion. Basic probability concepts. Hypothesis testing: one, mean, percentages (proportions), variances. Linear regressions and correlation. (Total notional time: 140 hours)

STRENGTH OF MATERIAL I (SOA115B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to provide a thorough foundation for the behaviour of materials under the action of external forces as required at higher levels of study and for the purpose of economically designing machine components. (Total notional time: 140 hours)

STRENGTH OF MATERIALS (SOM216B, SOT115B) **1 X 3-HOUR PAPER**
STRENGTH OF MATERIALS I (SOM115B) **1 X 3-HOUR PAPER**

(Module custodians: Departments of Mechanical and Mechatronics Engineering and Chemical, Metallurgical and Material Engineering)

The purpose of this module is to provide a thorough foundation for the behaviour of materials under the action of external forces as required at higher levels of study and for the purpose of economically designing machine components. (Total notional time: 140 hours)

STRENGTH OF MATERIALS II (SOM307B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to provide a sound foundation in the study of Mechanics of Materials and advanced knowledge of the behaviour of materials under the action of external forces as required at higher levels of study and for the purpose of economically designing machine components. (Total notional time: 280 hours)

STRUCTURAL ANALYSIS AND STRENGTH OF MATERIALS: STRUCTURAL ANALYSIS (SA216DB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

The purpose of the module is to provide students with the knowledge and tools necessary to analyse and design complex structures that cannot be fully analysed using traditional static methods due to their indeterminate nature. This module aims to teach the principles of structural analysis including the use of matrix methods, slope deflections, moment distribution techniques, and stiffness methods (using virtual work and moment area method) to solve indeterminate structures. After completion, the students would have gained the knowledge and skills necessary to analyse statically indeterminate structures. (Total notional time: 140 hours)

STRUCTURAL ANALYSIS AND STRENGTH OF MATERIALS: THEORY OF STRUCTURES (SA216CB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

The purpose of the module is to provide students with an understanding of the behaviour of solid bodies and structural elements subjected to various types of loads, as well as the principles governing the analysis and design of structures. This module typically covers topics such as stress, strain, deformations, material properties, internal forces, bending moments, shear force diagrams and the analysis of statically determinate structures. After completion, the students would have gained the knowledge and skills necessary to analyse statically determinate structures. (Total notional time: 140 hours)

STRUCTURAL ANALYSIS IV (SAS118S) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

The purpose of this module is to provide students with the advanced knowledge and tools necessary to analyse and design complex structures that cannot be fully analysed using three equilibrium equations due to their indeterminate nature. This module aims to teach the principles of structural analysis including the use of matrix methods, Beam-column Analogy, Beams on Elastic Foundations and Three-Dimensional Structures and Grillages to solve indeterminate structures. On completion, the student would have developed the knowledge and skills regarding the theory of structures to analyse advanced statically determinate and indeterminate structures under the influence of static loads. (Total notional time: 100 hours)

STRUCTURAL DESIGN: REINFORCED CONCRETE AND MASONRY (ST317CB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

The purpose of this module is to provide broad and sound fundamental principles in: Limit state design; Structural reinforced concrete design (designing reinforced concrete beams, columns, staircases, slabs, and foundations); Structural design of masonry (structural masonry walls and Masonry columns); and Sketching and detailing using structural design and detailing codes. (Total notional time: 140 hours)

STRUCTURAL DESIGN: STRUCTURAL STEEL AND TIMBER DESIGN (ST317DB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

The purpose of this module is to provide broad and sound fundamental principles in: Load analysis (wind load analysis and load combinations); Structural steelwork design (designing steel beams and plate girders, design of tension members, design of compression members, beam-columns, steelwork connections design); Structural Timber design (beams, tensile members and compression members and connections); and Sketching and detailing using structural design and detailing codes. (Total notional time: 140 hours)

STRUCTURAL DESIGN IV (STD118S) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

The purpose of this module is to provide broad and sound fundamental principles in limit state design, structural reinforced concrete design (designing reinforced concrete circular reservoir), design of composite sections, Structural design of steel structures (design of steel framed Industrial buildings with crane loads), sketching and detailing using structural design and detailing codes. (Total notional time: 150 hours)

STRUCTURES AND CONCRETE III (SAC306D) **1 X 3-HOUR PAPER**

(Module custodian: Department of Building Science)

Unit of measurement, laws of motion, forces and moment of forces, simple rigid body of equilibriums problems, centres of gravity and centroids, stress-strain and elasticity, simple beam designs and beam reactions. Concrete and concrete design. Sectional properties of different structural elements, reactions, shear forces on cantilever beams, elastic theory of beams, equilibrium in structural elements, deflections of simply supported beams, analysis stresses on structural bases, analysis of retaining walls, pre-stressed concrete, determinacy of structures, structural analysis of parabolic and circular arches, introduction to struts, and solving problems using Euler, Rankne and Perry Robertson theories. (Total notional time: 200 hours)

STUDIO WORK IV (STW408P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Expert architectural studio work, focusing on: (1) The overall process of 'design, develop, model and make'. (2) A hands-on, studio-based learning environment moving projects from proposal to an interactive product; (3) Prototyping skills from carpentry to digital fabrication, electronics, and coding; and (4) Research contribution to the WikiHouse project. (Total notional time: 300 hours)

SUPPLY CHAIN SYSTEMS (SCS317B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

The purpose of this module is to provide general supply chain knowledge, as well as the fundamental ways in which a supply chain can be designed, implemented and managed. (Total notional time: 140 hours)

SUPPLY CHAIN MANAGEMENT (SPP129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Defining the supply chain and its performance, Achieving Strategic Fit and Scope, Supply chain drivers and metrics, Distribution network design, Network Design in the Supply Chain, Designing Global Supply Chain Networks, Demand Forecasting in a Supply Chain, Aggregate Planning in a supply chain, Sales and Operations Planning, Coordination in the Supply Chain and global Value chain, Technology Venture Creation. (Total notional time: 150 hours)

SUSTAINABLE MANAGEMENT (SMG118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Civil Engineering)

An overview of the technical processes found in systems engineering; The emergence of sustainable strategic management; In search of sustainability; Environmental analysis for sustainable strategic management; Sustainable strategic management resource assessment; Concepts and instruments for corporate sustainability management; Innovation and technology management in the engineering field; Project management in the engineering field; and Sustainable management assignment and group presentation. (Total notional time: 100 hours)

SYSTEM DYNAMICS (SYD118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Introduction to system dynamics and mechanistic models; Causal models; Dynamics of Mechanistic models, based on fundamental conservation principles; Structure and behaviour of dynamics systems, based on causal dependencies; Steps in fundamental and causal modelling; Agent-based modelling; Distributed systems in engineering modelling. (Total notional time: 150 hours)

SYSTEM DYNAMICS (1YD118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

On the completion of this module, students will gain knowledge and experience in basic numerical techniques that are commonly used in scientific computing, such as a solution of linear equations (with vectors and matrices) and nonlinear equations (by bisection, iteration, and Newton's method), interpolation, curve-fitting, difference equations, iterated maps, numerical differentiation and integration, and differential equations. To implement these numerical techniques, computer systems and programming language for scientific computation will be introduced and practiced in projects, under the direction of lecturer/researchers in the department. MATLAB and Python will be used as the programming platform, by introducing elementary programming skills useful for applications relying on numerical data analysis (including simulations of complex engineering systems and scientific visualisation). Toolboxes and packages widely used in scientific computing in MATLAB and Python will be introduced and used for solving problems in the projects. (Total notional time: 150 hours)

SYSTEM ENGINEERING (SYE307B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Systems thinking, concepts, methodologies, models, and tools needed to understand, tailor, and apply systems engineering to most types of human-made systems. Interdisciplinary application of scientific and engineering effort, role as systems thinkers and process engineers. The nature of systems engineering being life-cycle orientated ensures the study of systems engineering encompasses, economic, environmental and social implications of bringing systems into being, whether it be products, services, operations, temporary or permanent projects. (Total notional time: 280 hours)

T

TECHNICAL DESIGN STUDIO (TDO109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

In this module, the design proposal of a real-world project must be developed through all the documentation stages. This module involves applied research and uses a realistic professional commission to expose the student to a collaborative and multidisciplinary environment. (Total notional time: 180 hours)

TECHNICAL MATHEMATICS (TMA105C) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mathematics and Statistics)

Matrices, engineering calculations, functions for engineers, trigonometry, geometry, vectors, Introduction to differentiation and integration, applications of differentiation and integration, and data handling. (Total notional time: 210 hours)

TECHNOLOGY VENTURE CREATION (TVC129N) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Translation of ideas into commercially viable high technology venture. Development of business plan and funding strategies are discussed. To elucidate the role of creativity, entrepreneurial and innovative business activities, and their management, within a global environment, and also of gender and ethnic diversity. (Total notional time: 150 hours)

THEORY AND HISTORY OF ARCHITECTURE I (THR105P, THR005P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Fundamental theory and history of architecture, focusing on: (1) Ancient and contemporary architecture. (2) General characteristics of African architecture. (3) Geographic influences on African architecture. (4) Religious influences on African architecture. (5) Palaces and shrines. (6) Vernacular architectures; and (7) Timelines of African architecture and pertinent artefacts. Architectural theory and history is studied through the theoretical lenses of: (1) Geometric principles of organisation. (2) Form and space. (3) Proportion and scale resulting in a normative position on architecture. (Total notional time: 120 hours for THR105P and 60 hours for THR005P)

THEORY AND HISTORY OF ARCHITECTURE II (THR216P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Intermediate theory and history of architecture, focusing on: (1) Historical development of infrastructures and services. (2) African artefacts c. 24 000 BCE to the present, and (3) Architecture without architects. Architectural theory and history is studied through the theoretical lenses of: (1) Elements of architecture. (2) Mass production and craftsmanship. (3) Problem-solving and art practice. (4) Pattern, form and meaning, resulting in a normative position on architecture. (Total notional time: 120 hours)

THEORY AND HISTORY OF ARCHITECTURE III (THR307P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Advanced theory and history of architecture, focusing on: (1) The architecture of the African diaspora. (2) South African modernity. (3) Afro-futurism. (4) Architectures of resistance. (5) Rhetoric and ideology in architecture; and (6) Moxomatsi and the Bokoni. Architectural theory and history is studied through the theoretical lenses of: (1) Politics. (2) Power, difference and embodiment. (3) Aesthetics, pleasure and excess. (4) Nation, world and spectacle. (5) Memory, tradition and identity, resulting in a normative position on architecture. (Total notional time: 120 hours)

THEORY AND HISTORY OF ARCHITECTURE IV (THR408P) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Expert study of theory and history of architecture, focusing on: (1) The City, the metropolis and territory. (2) Building typologies. (3) Pre-colonial African cities. (4) Contemporary African and Global South cities, and (5) Humanitarian projects. Architectural theory and history are studied through the theoretical lenses of: (1) Sequence. (2) Montage, collage and composition. (3) Nature, ecology and sustainability. (4) Science, technology and virtuality. (5) Design, production and practice. (6) Nomadic place-making resulting in a Normative position on architecture. (Total notional time: 120 hours)

THEORY OF DESIGN V (THD109M) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Architecture and Industrial Design)

Architectural theory as a precursor to the built form. Formulating a normative position within the broad development of architectural theory. Research paper related to a specific field of interest. (Total notional time: 70 hours)

THERMAL ENERGY SYSTEMS (THT118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

Introduction to energy systems; Introduction to energy impacts, economics, policies, and sustainability; Basics of thermal energy systems; Analysis of thermal energy systems; Fluid transport in thermal energy systems; Energy transport in thermal energy systems; Simulation, evaluation, and optimisation of thermal energy systems; and System engineering management. (Total notional time: 150 hours)

THERMODYNAMICS (THE207B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to equip the student with a fundamental understanding of the principles of thermodynamics and how these fundamentals are applied in the design and analysis of thermo-fluid systems. (Total notional time: 280 hours)

THERMO-FLUIDS (TFL206B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

Introduction to fluid flow, fluid mechanics and the basics of heat flow in the form of fundamental thermodynamics and principles thereof. (Total notional time: 280 hours)

THERMOFLOW (TMF307B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

Introduction to fluid flow, fluid mechanics and the basics of heat flow in the form of fundamental thermodynamics and principles thereof. (Total notional time: 280 hours)

TRANSPORTATION ENGINEERING: GEOMETRIC DESIGN II (TR317DB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

This module consists of civil engineering's geometric principles, covering adequacy, cross sections, alignment, earthworks, drainage, and access design. The module emphasises the importance of safe, efficient infrastructure design, ground preparation, water management, and integration with transportation networks. The curriculum also includes engineering ethics, professionalism, and standards, preparing students for contemporary infrastructure design challenges with a focus on ethical practice and industry adherence. (Total notional time: 140 hours)

TRANSPORTATION ENGINEERING: PAVEMENT TECHNOLOGY II (TR317CB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

This module investigates the intricacies of pavement construction and maintenance, starting with in-situ materials and borrowing pits to understand the selection of appropriate construction materials. The module addresses the challenges of problematic soils and the importance of material testing for quality assurance. Students will learn pavement design methods and applications to ensure durability and efficiency in road construction. The curriculum covers both asphalt surfacing and concrete pavement techniques, providing a comprehensive overview of surfacing options. Traffic techniques and transportation demand analysis are included to align pavement design with traffic needs. The module concludes with maintenance, rehabilitation, and construction of pavements, emphasising the ongoing care required to sustain pavement infrastructure. Students are equipped with the technical knowledge for advanced pavement technology applications. (Total notional time: 140 hours).

TRANSPORTATION ENGINEERING: TRANSPORTATION TECHNOLOGY I (TR216DB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

This module equips students with advanced knowledge in designing and implementing efficient transportation infrastructures. Key aspects include the design of signal settings for optimising traffic flow, the selection and testing of materials for durability, and the design of pavements for creating resilient road surfaces. Students will also explore the design of single and double stone surfacing, as well as sand seals, slurries, and diluted emulsions for maintaining and enhancing pavement performance. The module culminates in studying Integrated Transportation Systems, emphasising the coordination between different modes of transport for seamless mobility. The module also prepares students for innovative solutions in transportation engineering. (Total notional time: 140 hours)

TRANSPORTATION ENGINEERING: TRANSPORT PLANNING I (TR216CB) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

This module covers advanced-level transportation systems, covering principles, characteristics, geometric design, traffic counting, flow models, and capacity analysis. Students will learn to design, analyse, and improve transportation networks, focusing on efficiency and safety. Throughout this module, students will gain the skills to tackle transportation challenges, enhancing mobility and service quality in urban and regional settings. This comprehensive study prepares students for practical applications in transportation planning and management. (Total notional time: 140 hours)

TRANSPORTATION ENGINEERING IV (TRE118S) **1 X 3-HOUR PAPER**

(Module custodian: Department of Civil Engineering)

This module covers various aspects of transportation systems and infrastructure. The module delves into Traffic Measurements, Analysis, and Design, providing students with the tools and knowledge to assess and optimise traffic flow. Forecasting Travel Demand and Modelling is another critical component, enabling students to anticipate future transportation needs and plan accordingly. Route Determination and Road Safety are key focal points, emphasising the importance of safe and efficient road networks. Additionally, the module explores Transportation Innovation and technology, highlighting new materials and cutting-edge advancements, fostering a modern approach to Transportation Engineering. (Total notional time: 150 hours)

TRANSPORTATION MANAGEMENT (TPM129N) **CONTINUOUS ASSESSMENT**
(Module custodian: Department of Industrial Engineering)
Introduction to Transportation Management, Transportation Logistics and Freight Management, Traffic Planning and Management, Environmental and Economic impacts, Transportation Management Systems, Transportation Infrastructure Development, Transportation Innovation and Technology. (Total notional time: 150 hours)

U

UNIT OPERATIONS (UNO216B) **1 X 3-HOUR PAPER**
(Module custodian: Department of Chemical, Metallurgical and Materials Engineering)
Psychometrics charts and cooling towers; Distillation; Adsorption; Drying; Extraction; and Leaching. (Total notional time: 140 hours)

W

WASTEWATER SYSTEM OPERATION AND MAINTENANCE (WWS115C) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
Waste collection, treatment and discharge systems. Septic tanks and pumping systems. Wastewater treatment and effluent discharge methods. Collection systems and maintenance and troubleshooting. (Total notional time: 140 hours)

WATER ENGINEERING: HYDRAULICS I (WA216DB) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
The module covers the following: Fluid properties, Hydrostatics, Hydrodynamics, Pipe network analysis, Pumps, and Dimensional analysis. (Total notional time: 140 hours)

WATER ENGINEERING: HYDROLOGY I (WA216CB) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
The module covers the following: Hydrologic cycle and processes, Surface run-off, Hydrographs, Open channel flow, Groundwater, and Flood rooting. (Total notional time: 140 hours)

WATER ENGINEERING: WATER AND WASTEWATER RETICULATION II (WA317DB) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
This module covers water, wastewater and stormwater reticulation systems: network modelling, network operation and maintenance, ancillary works, water management, waste management, environmental aspects, and design project(s). (Total notional time: 140 hours)

WATER ENGINEERING: WATER AND WASTEWATER TREATMENT TECHNOLOGY II (WA317CB) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
Wastewater properties, treatment processes, treatment plant design, environmental factors, plant operation and management. Properties of water, treatment processes, treatment site design, recalculation, re-use, recovery and conservation of water and environmental factors and Design project(s). (Total notional time: 140 hours)

WATER ENGINEERING IV (WAE118S) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
This module covers the design of groundwater systems, hydropower systems, irrigation systems, advanced water treatment systems, and advanced wastewater treatment systems. (Total notional time: 250 hours)

WATER RETICULATION OPERATION AND MAINTENANCE (WRO115C) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
Storage facilities. Reticulation facilities. Water quality characteristics in reticulation networks and reticulation network operation and maintenance. (Total notional time: 140 hours)

WATER SYSTEM OPERATION AND MAINTENANCE (WSO115C) **1 X 3-HOUR PAPER**
(Module custodian: Department of Civil Engineering)
Water Sources and Treatment. Wells. Water treatment plants and disinfection. (Total notional time: 140 hours)

WIRELESS COMMUNICATIONS (WCO118S) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Fundamentals of wireless communications; Capacity of wireless channels; Cellular systems - multiple access and interference management; MIMO wireless communications; Wireless communication link analysis; and Radio resource management techniques for next generation wireless networks. (Total notional time: 150 hours)

WORKSHOP PRACTICE (WOP115C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Mechanical and Mechatronics Engineering)

The purpose of this module is to equip the student with a fundamental knowledge of the use of hand tools and how to use them to manufacture parts using different materials. (Total notional time: 140 hours)

WORKSHOP PRACTICE (WSP115C) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Workshop safety. First aid. Measuring techniques. Tools (hand tools, pneumatic/hydraulic/electric). Soldering. Printed circuit board design. Wiring circuits (electrical). Construction and application. (Total notional time: 140 hours)

WORKSHOP PRACTICE (WSP215D) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

Practical application of electrical engineering concepts as in single- three-phase applications which include various machine starting methods, rotor testing, transformer tests, distribution board layout and wiring and basic house wiring techniques. (Total notional time: 120 hours)

WORK INTEGRATED LEARNING (WBS216D) **WORK-INTEGRATED LEARNING**

(Module custodian: Department of Building Science)

Students are required to work for six months with approved employers who are –

- building contractors (preferably with MBA or BIA);
- registered quantity surveyors; or
- other employers approved by the Department of Building Sciences as being able to provide students with suitable Work-Integrated Learning.

Students should be given a broad introduction to the building industry and gain experience in the build industry as much as possible. (Total notional time: 600 hours)

WORK-INTEGRATED LEARNING: GEOMATICS (WGM306D) **WORK-INTEGRATED LEARNING**

(Module custodian: Department of Geomatics)

A practical module, that combines and applies knowledge gained from all theoretical modules in years one and two of the programme. The module will prepare the student for the working environment prior to graduation, will build their personal and professional ethics and enable students to be work ready. (Total notional time: 1200 hours)